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FILICES BRITANNICÆ;

A N

H I S T O R Y

O F T H E

BRITISH PROPER FERNS.

With PLAIN and ACCURATE DESCRIPTIONS,

A N D

NEW FIGURES of all the SPECIES and VARIETIES,

Taken from an immediate and careful Inspection of the Plants in their Natural State, and engraved on Thirty-One Copper-Plates; with the particular Places noted where each Species was lately gathered, and are at this Time growing in the North of England, or on the Mountains of Wales.

By JAMES BOLTON, of HALIFAX.

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THE HISTORY OF THE
ROYAL SOCIETY OF MEDICINE



INTRODUCTION.

THE author of this little essay scarcely knows what apology to make for presuming to appear before the public in a science which has afforded employment for the pens of so many learned men, and able naturalists.

What he has here attempted is to bring together and illustrate the British proper Ferns ; no attempt of the kind having ever before appeared in our own, or any other language. The greatest part of them have indeed been figured and described, but many of those figures are too inaccurate to give a clear and distinct idea of the plant, and being scattered through the volumes of many authors, will subject to a very great expence, those who are desirous to inform themselves of a tribe of plants so singular and beautiful as the British proper Ferns must be allowed to be.

It is the intention of the author in this undertaking to give a clear and distinct idea of every species in its various stages of growth, and under the various accidents it is liable to, as far as is necessary for enabling the student to discriminate each with ease and certainty ; to exhibit them at one view, and at a small expence. And if it appears that he has acquitted himself well in these particulars, he wishes not for a more eligible plea.

Many who wish to be informed of the indigenous plants of our country have neither leisure nor inclination to pursue the science of Botany in its more extensive track, to purchase and peruse the numerous volumes, and to acquire an understanding of the more numerous terms now necessary to be read and understood, much less to undergo the expence and bodily fatigue which must be sustained before we acquire an original, personal knowledge of the objects in view, without which we never arrive at the summit of the arduous and pleasing pursuit.

To make the little that I have written as plain as possible to the apprehension of every one, I have avoided as much as I could, the use of the more difficult botanic terms.

In describing the ferns, instead of the latin terms, *frons*, *pinnæ*, *pinnulæ*, &c. I make use of the more familiar ones, *first leaves*, *second leaves*, *third leaves*, and *lobes*; and, to render my meaning still plainer, I have illustrated it with figures, *see Table 1*, where

Fig. 1 is a first leaf complete, aaaaa the rib.

Fig. 2 a second leaf cut off at b.

Fig. 3 a third leaf cut off at c.

Fig. 4 the lobes.

The fructifications, which are generally placed on the back of the lobes, I have called *seed-vessels*, as the most plain and expressive

Tab. 1.



expressive name I could think of, being more proper than that of *flowers*; as the parts which constitute the flowers of a fern are much too minute for the inspection of the naked eye.

In plate 1st, d, c, f, I have given a borrowed figure of a single globe, or separate seed-vessel. These are placed in great numbers on the under side of the lobes, and every assemblage of them covered with a thin transparent film, at first of a pale whitish colour, and as it advances in growth of a brownish hue; before the seeds are ripe it bursts open, and discovers the little globes, which are afterwards greatly increased in magnitude, much extending laterally and enlarging the space occupied by the assemblage while wrapped up in its primary cover. The globes, or separate seed-vessels, are of a figure truly spherical, and are attached to the surface of the leaf by a short footstalk, g. They are surrounded with an articulate chain, or elastic ring, e, d, which, when the seeds are ripe, breaks at h, tears open the shell i in a vertical direction, discharges the seeds, and, as the chain further contracts itself, throws open the two valves f, in an horizontal direction, by which the space of the assemblage is again considerably enlarged, and hence it is that some of the polipodia, and many of the asplenia, become covered with seed-vessels in the last stages of their growth, and thereby become acrosticha according to the present mode of arrangement.

It

It is from the arrangement or disposition of these feed-vessels that the characters of the genera in the proper ferns are at this time established.

In the genus *Ophioglossum*, the feed-vessels are placed in two distinct lines, one on each side of the filament or tongue, giving it the appearance of a flatted spike.

In *Osmunda*, some species produce their feed-vessels in bunches of short spikes at the termination of the fertile leaf, as in Osmund royal, and Moonwort ; in others, they are arranged in lines along the back of the lobes, as in Curled Stone Fern, and Rough Spleenwort.

In *Acrostichum*, the feed-vessels are dispersed upon and cover the whole under side of the lobes.

In *Polipodium*, the feed-vessels are disposed in circular spots on the under side of the lobes.

In *Asplenium* they are placed in right lines, generally running in an oblique direction on the supine disk of the leaves or lobes.

In *Pteris*, the feed-vessels are placed in lines along the under margins of the lobes, which are gently rolled backwards.

In *Adiantum*, the feed-vessels are disposed in short lines, or oval spots, near the extremities of the lobes, which are often terminated by their filmy expansions that are bent back and cover them.

In

In *Trichomanes* the seed-vessel is of a globular figure, single, enclosed in its own proper cover, solitary, supported on its own filament or footstalk, which arises from the membranaceous verge of the rib at the origin of the second leaves.

This method of arrangement, though the best that has yet been adopted, is in several instances vague and defective.

In many species of the genus *Asplenium*, whose characteristic is to have the seed-vessels arranged in distinct lines, they, when arrived at maturity, encrease in breadth so as to unite at their extremities and cover the whole under side of the lobes; this is frequently the case in *Asplenium ceterach*, *Asplenium ruta-muraria*, *Asplenium adiantum nigrum*, &c. in the months of September and October.

In several of the *Polipodia*, we observe the same confluency or union in the older stages of the plants; such for instance as *Polipodium fragile*, *Polipodium thelypteris*, and *Polipodium fontanum*.

In the genus *Acrostichum*, whose primary character is to have the under side of the lobes quite covered with seed-vessels, these seed-vessels are disposed in distinct round dots on the back of the lobes in *Acrostichum ilvense*; in *Acrostichum septentrionale* they are placed, while immature, in short lines. The first of these therefore, while young, is a *Polipodium*, the last an *Asplenium*.

The

The *Asplenium ceterach*, *Asplenium ruta-muraria*, *Asplenium adiantum nigrum*, *Polipodium fragile*, *Polipodium thelypteris*, and *Polipodium fontanum*, in the last stages of their growth, become *Acrosticha*.

In *Osmunda*, whose character is to have the seed-vessels disposed in bunches of spikes at the extremities of the rib of the fertile leaves, we find the *Osmunda spicant*, whose seed-vessels are disposed in lines along the under side of the lobes, of the fertile leaves; and the *Osmunda crispa*, in which they are placed in lines under the verges of the lobes, which are gently rolled back upon them as in the *Pteris aquilina*.

It must offend the taste of the judicious reader to find the characteristics of the Genera fixed on foundations so unsteady, when he finds plants very dissimilar in their appearance united; as also when he sees a separation take place between *Osmunda lunaria* and *Ophioglossum vulgatum*, between *Acrostichum septentrionale* and *Asplenium ruta-muraria*.

In a family of plants so nearly approaching in general habit, and whose characteristic notes are in nature too minute for our inspection, there is no way of acquiring a perfect knowledge of the species, and varieties, but by making careful and repeated observations upon the plants themselves, in the natural places of their growth.

In

In most of the British proper Ferns the seedling plants require a succession of seasons before they produce their fructification. The first year that a seed vegetates, it produces a single leaf only, which seldom attains to more than one inch in height, is thin, semi-transparent, and most commonly entire. The second year two or three are produced, one larger than the other. The third year four or five are produced; and the fourth year, more in number, proportionable to the richness and propriety of soil and situation.

Through this progress of growth, the young plants appear in various shapes according to the various matter and place in which they grow. When the seeds take root in moist and fertile soils, in shaded situations, on mossy dripping rocks, or near currents or rills of spring water, they produce leaves of a thin, light, semi-transparent substance. When on dry rocks, and in barren soils, where they are more exposed to the air and the sun, the leaves are few in number, short, firm, and opaque. The former plants produce larger and more numerous leaves; but the latter produce seeds in fewer years from the first springing up: The first are apt to produce leaves monstrous in shape or size; the last generally retain their own proper figure.

The difference of size, in consequence of soil and situation, is as remarkable in Ferns as in any other tribe of plants. We frequently see leaves of *Polipodium filix-mas*, and *Polipodium*

b

filix-

felix-femina, four or five feet in length, yet I have seen perfect leaves in fructification not more than nine inches high in the former, and little more than six in the latter species. Hence, in my descriptions, when I say the leaves are from one to four feet in height, from four to twelve inches, &c. I would be understood to mean, that the leaves in both cases are grown to as great a degree of perfection as the situation and soil will admit of, that the roots are of a sufficient age, and that the plants of the smaller as well as larger size are in complete fructification.

In moist and rich soils, the *Polipodium cristatum* has an upright rib, and attains the height of three or four feet; the first pair of second leaves are shorter than those next above them; the leaf, for the most part of its length is triply pinnated, or, in our own way of describing, divided into second leaves, third leaves, and lobes. Upon dry rocks and banks, the plant is ten or twelve inches high, the rib curves backwards from the insertion of the first pair of the second leaves, which are by much the largest, and only this first or lowest pair are triply divided.

For want of paying proper attention to these accidental circumstances, many imaginary species have been admitted in the lists of British ferns. A desire to multiply the species of plants seems to have prevailed amongst the Botanists of the last age. The works of Tournefort, Vaillant, Micheli, Plukenet,

Tab. 2



net, and others, abound with imaginary species; most of which, however, by the more accurate observations of the Botanists of the present age, are again reduced to their originals.

For the satisfaction of those who desire further information, I have figured several varieties in *Tab. 2.*

In *Ophioglossum vulgatum* there is a variety which produces several seed-spikes as in *Tab. 2. Fig. 1.*

In *Asplenium trichomanes* there is a variety, having the leaves divided into several lobes, which are crenated on the extremities in an elegant and beautiful manner, *Tab. 2. Fig. 2.*

In very moist and rich situations, the leaves of *Asplenium viride* sometimes become proliferous, throwing out other leaves from their sides, *Tab. 2. Fig. 3.* In this state it has been considered as a species, *see Sp. Pl. 1541*, where it is called *Asplenium trichomanes-ramosum*.

There is a variety of *Asplenium marinum*, wherein the lobes are divided and subdivided, as in *Tab. 2. Fig. 4.* This has been named *Adiantum trapeziforme*.

The *Polipodium cambricum*, *Tab. 2. Fig. 5. a.*, is now known to be a variety of *Polipodium vulgare*. There is also another variety of the same plant lately discovered by my esteemed friend Mr. Alexander, of Halifax, in a wood near Bingley, *Tab. 2. Fig. 5. b.*

There is a tall slender variety of *Polipodium fragile*, which has been taken notice of, and termed *Polipodium rheticum*; *see Tab. 2. Fig. 6.*

There is a variety of *Trichomanes tunbrigense*, which grows in little caverns under moist rocks where the sun is excluded, and where the water, dripping from the points of the leaves, enlarges them greatly; in this state the plant has been taken notice of, and called *Trichomanes pyxidiferum*; *see Tab. 2. Fig. 7.*

The varieties of *Asplenium scolopendrium* are many, and very well known.

Asplenium adiantum nigrum, *Polipodium aculeatum*, and some others are likewise subject to varieties, some of which I have figured on their respective plates.

Some of the British Ferns have formerly been in great esteem on account of their supposed vulnerary and pectoral qualities, but like many other valuable home medicines, they are disregarded in the present practice.

The use of Fern ashes in the making of glass, boiling of soap, dying, &c. is very well known, and needs not here be insisted on.

Fern, by reason of its abounding in salts, is certainly an excellent manure for land, if cut down while green, mixed with a third part of cows dung, and laid in large heaps to rot.

Fern, being cut down, dried, and used as litter in the planting of potatoes, has sometimes been known to produce an extraordinary crop; whether it would always have the same effect deserves a fair trial.

Many

Many of the Ferns might with great propriety be introduced into our botanic gardens ; not merely with a view to increase the number of plants in these gardens, but also on account of the agreeable contrast they produce when interspersed amongst plants of all the other classes, of their own beautiful singularity, and of the great ease with which they are procured and preserved.

In the hot-house or stove they become evergreens, and their beauty is greatly improved in respect to colour and delicacy. When planted in pots, and placed amongst other plants, their soft, feathery, filken clumps produce an effect which must be pleasing to every one.

The species most proper for introducing as rare plants into the hot-house are, *Osmunda crispa*, *Acrostichum septentrionale*, and *Acrostichum ilvense*, *Asplenium viride*, *Asplenium marinum*, and *Asplenium lanceolatum*, a variety of the last ; *Polipodium lonchitis*, *Polipodium fontanum*, *Polipodium fragrans*, *Polipodium rheticum*, *Polipodium dryopteris*, *Polipodium phegopteris*, *Polipodium thelypteris*, and *Polipodium fragile* ; *Adiantum capillus veneris* ; and *Trichomanes tunbrigense*.

Of Ferns less rare, of a proper size to be introduced for the sake of number and variety, *Ophioglossum vulgatum*, *Osmunda lunaria*, *Osmunda spicant*, and *Asplenium ceterach*,
c Asple-

Asplenium trichomanes, *Asplenium ruta-muraria*, *Asplenium adiantum nigrum*, and *Polipodium vulgare* with its varieties.

Those which are proper for planting on dry rocks, whether natural or artificial, are *Asplenium adiantum-nigrum*, *Asplenium marinum*, and *Asplenium ruta-muraria*; *Polipodium fragile*, and *Acrostichum septentrionale*: these naturally grow on dry and barren rocks. And can any thing be more beautiful than the firm texture, the deep glossy green, the elegant divisions and sub-divisions of the first, second, third, and fifth of these, when contrasted with the soft, silken, feathery appearance of the fourth?

On moist overshadowed and dripping rocks we find *Acrostichum ilvense*, *Asplenium trichomanes*, *Asplenium viride*, *Polipodium lonchitis*, *Polipodium fontanum*, *Polipodium aculeatum*, *Adiantum capillus-veneris*, and *Trichomanes tunbrigense*.

In dark moist and shady places, under trees to enrich the ground, *Polipodium phegopteris*, *Polipodium dryopteris*, and *Asplenium scolopendrium* with its varieties.

In lines, or little clumps along the margins of grass plats, walks, or borders, may be planted *Ophioglossum vulgatum*, and *Osmunda lunaria*.

The roots of the larger kinds of Ferns are firm, well fixed in the ground, and very durable; they continue in the places where

where they have once been planted, and do not send out suckers or runners to disturb the neighbouring plants, or to occupy more space of ground than is allotted them ; hence they are very proper for planting round the verges of artificial bogs or fish-ponds, their roots forming a lasting barrier between the wet and the dry. The species most proper for this purpose are *Osmunda regalis*, *Polipodium filix-mas*, *Polipodium filix-femina*, *Polipodium thelypteris*, and *Polipodium cristatum*.

The seeds of Ferns, though very numerous, are extremely small, and never, or very rarely, take root in cultivated ground : they will not therefore render the garden less fertile, or incommode the gardener by encreasing the number of weeds.

The leaves of the larger Ferns, if cut down at the time of their full growth, and properly dried, make a thatch much more durable than that of any kind of straw ; and, by their lightness and natural warmth, may be used as the best litter for securing tender seedlings from the effects of frost.

The drawing and etching of the figures are performed wholly by my own hands, from a close and careful inspection of the plants. The employing an engraver would have been attended with a considerable and certain expence ; and as the reimbursement was very uncertain, I chose to undertake it myself, though I had never before practised the art of etching,

etching, that I might hazard only the loss of so much of my own time. The truth of drawing in all the figures may be relied on, and the descriptions are faithful. For the execution of the plates in the engraving part, and for the stile in writing, I can make no other apology than that of throwing myself on the humanity of my friends and the publick.

HALIFAX, *August 16th, 1785.*

The books I have referred to are few, and such only as may be supposed to be in the possession of every English Botanist, namely,

Lin. Sp. Pl. Caroli Linnæi Species Plantarum, 2 tom. 8vo. Holm. 1762.
Flo. Scot. Flora Scotica by the Rev. Mr Lightfoot, 2 v. 8vo. London, 1777.
Flo. Ang. Gul. Hudsoni, Flora Angelica, 2 tom. 8vo. London, 1778.
Ger. Em. Gerard's Herbal, enlarged by Johnson, Folio, London 1633.
Park. Parkinson's Herbal, or Theatre of Plants, Folio, London, 1640.

The other British Ferns, viz. the Equisetum, Pilularia and Isoetes, with new figures and descriptions, may shortly appear to complete the history of British Ferns, if the present part be well received.

FILICES

D

O P H I O G L O S S U M vulgatum.

Lin. Gen. Plan. 1171. *Spec. Plan.* 1518. *Ray Syn.* 128. *Flo. Scot.*
651. *Flo. Ang.* 449. *Ger. Em.* 404. *Park.* 506.

T A B. III.

A D D E R S T O N G U E.

THE root consists wholly of fibres, often furnished with a bulb-like hybernaculum, which contains a succeeding plant in embryo.

The proper stalk is green, flattish, from two to four inches high, supporting one leaf at the top; the leaf is tongue-shaped, two inches long, thick, glossy, succulent, and of a firm substance, varying in colour from a light to a dark green.

Seed vessels arranged in two rows, and forming a jointed spike, the rows placed opposite; when ripe, they burst transversely, and discharge small seeds; the spike is supported on a stalk two or three inches high, arising from the point where the tongue-shaped leaf is united to the first stalk, by the bottom of which leaf the spike stalk is partly surrounded and embraced.

V A R I E T I E S.

Tab. 3.



*Ophioglossum
vulgatum*

J.B. 1785



V A R I E T I E S.

Adders tongue is sometimes found with a spike stalk divided at the top, each division supporting a separate spike, *see Ger. Em.* 405 ; and *Tab. 2. Fig. 1.* Sometimes the leaves are a little gashed, or lobed, on one or both sides ; and sometimes have small appendages on one or both sides.

Ophioglossum Vulgatum grows in cold meadows and pastures, where the ground is moist, in the neighbourhood of Halifax ; particularly in a meadow adjoining to Mytham-Bridge, a mile from Halifax, in the way to Wakefield.

The seedspikes are in perfection about the beginning of June.

O S M U N D A

O S M U N D A. *Lin. Gen. Plan.* 1172.

OSMUNDA *Lunaria*. *Lin. Sp. Pl.* 1519. *Ray Syn.* 128. *Flo. Scot.* 652. *Flo. Ang.* 449. *Ger. Em.* 405. *Park.* 507.

T A B. IV.

M O O N W O R T.

THE root is composed of fibres adhering to the bottom of the stem, and to the bulb-like embrio of a future plant.

The leaf stalk is two or three inches high, firm, solid, and sometimes a little flattish; it supports one pinnated leaf, composed of eight or nine pairs of kidney-shaped lobes, ranged so close on the nerve as to lie over each other in an imbricated order, the lowest pair largest, decreasing gradually upwards, and a single one, the smallest, terminating the nerve at top.

Seed vessels supported on a stalk two or three inches high, growing from the top of the leaf stalk at the insertion of the leaf; it is divided into several branches near the top, to which branches the seed vessels are affixed in.

Tab. 4.



Comuna

Lenaria

in several rows, in imitation of spikes, the whole forming a handsome bunch pendent on one side, at first of a very pale greenish white, brown when ripe; and the seeds, when discharged, appear as if covered with a brown dust.

There is a variety with compound or branched leaves, *see Ger. Em.* 406. *fig.* 3.

Osmunda Lunaria grows amongst grass in cold meadows and pastures.

In pastures about Cold Edge, in Mixenden; in a small croft close by the house at Ball-Green, Sowerby; in the fields near Holy-Green, Northowram; and some other places in the neighbourhood of Halifax.

The plant is in its greatest perfection the first or second week in July.

On the ninth day of June 1785, I gathered on the top of an high bank of pasture ground, belonging to Shibden-Hall, near Halifax, a variety of *Osmunda Lunaria*, with leaves shaped like a lady's fan when fully expanded, divided by narrow sections running almost down to the base into four or five lobes, which are deeply crenated at their extremities.

O S M U N D A

O S M U N D A regalis.

Lin. Sp. Pl. 1551. *Flo. Scot.* 653. *Flo. Ang.* 449. *Park.* 1038.
Ger. Em. 1131.

T A B. V.

O S M U N D R O Y A L.

THE root is large, thick, hard, and woody, firmly fixed in the tough mire by its numerous long stringy fibres, and is closely covered by several folds of tough brown scales.

The first leaves are from two to four feet high, of an elegant longish oval shape; the rib smooth and glossy, having an hollow furrow on the upper side, round or gibbous on the under side, and naked a good way from the root.

Second leaves from six to ten pairs, the third or fourth pair from the root longest, thence to the top shortening by a sudden gradation; they are placed at an acute angle with the rib of the first leaf.

Lobes from five to ten pairs, tongue-shaped, irregularly lobed at their bottoms; the first pairs for half their number of equal length, thence to
the

Tab. 5.



Osmunda regalis



the top gradually diminishing, where they are terminated by a broad distinct lobe often having one or more appendages at its base ; these are the barren leaves, *see fig. 2.* where one of the second leaves is represented of its natural size.

Seed vessels, produced in large bunches at the summit of the fertile first leaves ; these leaves grow from the central part of the root, and resemble the barren first leaves till the fourth or fifth pair of second leaves, above which the rib terminates in a large pendent divided and subdivided bunch of short cylindrical spikes of seed vessels ; at first green, when ripe of a brown colour, and after the seeds are discharged appear as if covered with dust.

The whole plant is of a bright fresh green, and very elegant.

Osmund Royal grows in bogs and clay grounds ; in a little bog, in a field under Haddershelf-Scout, in Sowerby ; in a field near Mixenden Mill, and some other places in the parish of Halifax.

O S M U N D A

O S M U N D A spicant.

Lin. Sp. Pl. 1522. *Ray Syn.* 118. *Flo. Scot.* 654. *Flo. Ang.* 450.
Ger. Em. 1140. *Park.* 1042.

T A B. VI.

R O U G H S P L E E N W O R T.

THE root is of an irregular figure, hard and firm, covered with black scales, and furnished with many black fibres; when old they become large by reason of the stumps of many decayed leaves which abide upon them.

The barren leaves which rise from the circumferent part of the root are simply pinnate, lance-shaped, terminating in a point both below and above, from five to twelve inches high; the rib brown and glossy near the root, green above; whole leaf of a bright green colour.

Lobes of the barren leaves, from fifteen to thirty, lance-shaped, opposite or alternate, curved gently upwards, parallel, first pairs very short, confluent, and decurrent at their base, gradually lengthening to the middle, and thence growing shorter to the top, where they are narrow, close, and distinct.

Fertile

Tab. 6.



Adiantum spicant.

Fertile leaves longer than the barren, like them simply pinnate, and of the same general shape ; stem red, brown, and glossy.

Lobes on the fertile leaves from fifteen to thirty, longest in the middle, gradually shorter to the bottom and top of the fertile leaf, of a narrow linear shape, parallel, curving much backwards, of a dark glossy green above.

Seed vessels disposed in lines along the edges of the fertile lobes, the lines of equal breadth from one end to the other, at first narrow and of a pale green, afterwards brown, and, when the seeds are discharged, encreasing so as to cover the whole disk of the lobe, except the middle nerve.

The fertile leaves decay soon after the discharge of the seed ; the barren leaves in warm places continue green most part of the winter ; both are renewed in the spring.

Grows about old walls, rocks and rivulets, in woods, by road sides, and on moors ; in Birks wood, near Halifax, abundantly.

Scopoli makes this plant a *Struthiopteris*, *see Flora Carniolica, Ed. Secunda, Tom. 2, Pag. 288, No. 1258.*

O S M U N D A crispa.

Lin. Sp. Pl. 1522. *Ray Syn.* 126. *Flo. Scot.* 655.
Flo. Ang. 450.

T A B. VII.

C U R L E D S T O N E F E R N.

THE root consists of a multitude of slender fibres, much entangled with one another, and of a pale brown colour.

Barren first leaves from three to nine inches high, approaching in the general figure to an irregular oval; rib waved and green.

Second leaves same general shape with the first, six or eight pairs placed alternately, diminishing from first to last; rib waved.

Third leaves shaped like the first and second, four or five pairs placed alternate.

Lobes of the barren leaves two or three pairs, dented at the extremity with one or two dents, so that the lobes themselves are again lobed, the lowest pair generally with three, the next pairs with two, and the terminal with three or four of these lesser lobes; whole leaf a bright green.

Fertile

Tab. 7.



Osmunda crispa

G. W.

Fertile first leaves taller than the barren, of the same general figure, and of a darker green ; second leaves four or five pairs placed alternately, diminishing to the top, and terminating in a single lobe.

Third leaves consisting of two or three pairs of lobes with single ones interspersed.

Lobes simple, oblong, one third of an inch in length, rolled back at the edges, and of a thick firm substance.

Seed vessels placed in lines on the under margin of the fertile lobes, at first of a whitish colour, when ripe of a yellow brown, and, after the discharge of the seeds, encreasing in breadth so as to cover the whole disk of the lobe, except the middle nerve.

Osmunda Crispa grows on Ingleborough-Hill, Yorkshire ; on Hombleton-Hill, near Burnley ; under the great rocks at Clibbershaw-Dean, near Todmorden, *Mr. Wood* ; in Knotty-Lane, near Saddleworth-Ray, Lancashire ; but most abundantly on Snowdon, where I gathered the specimen which is represented on the plate in August A.D. 1784.

A C R O S T I C H U M.

A C R O S T I C H U M.

Lin. Gen. Plan. 1173.

A C R O S T I C H U M septentrionale.

Spec. Plan. 1524. *Ray Syn.* 120. *Flo. Scot.* 656. *Flo. Ang.* 450.
Ger. Em. 1561. *Park.* 1045.

T A B. VIII.

F O R K E D M A I D E N H A I R.

THE root consists of a number of fine, slender, brown fibres, connected to a small head.

The leaves from two to five inches high, linear and slender for more than half their length ; above, they divide sometimes into two, sometimes into three or four lobes.

The lobes are about an inch in length, lance-shaped, one sixth of an inch in breadth, and veined lengthways ; sometimes these lobes are entire, but often irregularly cut in on the edges, and forming little acute appendages on the sides, which are curved outwards.

Seed vessels first appear in small indistinct lines or dots on the back of the lobes, afterwards they flow together, and when the vessels burst, and the
 feeds.

Tab. 8



Arrostichan
sydent, male

feeds are discharged, cover the whole disk of the lobe with a thick close brown nap, which is the distinguishing characteristic of the Genus *Acrostichum*, as at present established.

Forked Maiden Hair. Grows on Ingleborough-Hill ; *Mr. Tofield*.
Fl. Aug. 451.

The specimens figured, I gathered in a garden from roots that had been brought from the King's Park, near Edinburgh, in Scotland ; it grows there out of the cliffs of the rocks about Arthurs Seat. *Mr. Lightfoot*.

ACROSTICHUM

A C R O S T I C H U M Ilvenſe.

Spec. Pl. 1528. *Ray Syn.* 118. *Flo. Ang.* 451.

T A B. IX.

H A I R Y A C R O S T I C H U M.

THE roots are ſmall, and furniſhed with a few black hard fibres.

Fiſt leaves from three to five inches long; the rib hairy, deſtitute of leaves almoſt half its length from the root; general ſhape of the leaf tapering from the baſe to the point.

Second leaves from ſeven to fifteen pairs, loweſt pairs largeſt and oppoſite, thence to the top becoming gradually leſs and alternate, and, near the ſummit, confluent at their baſe.

Lobes five or fix of an oblong figure with ſeveral dents on the edges, fiſt pair largeſt, thence decreaſing to the point, where one or two pairs become confluent, united almoſt their whole length; all of them broadeſt at the baſe, where they are confluent and decurrent.

Seed

Tab. 9.



Actostichum ilvorse.

Seed vessels first appear in round dots dispersed on the back of the lobes, which are covered with brown hairs ; after the seed vessels are burst, and the seeds discharged, the whole under side of the lobe appears covered with an hairy roughness, of a brown colour. *See Tab. 9, where Fig. 1 is a pinnula or lobe, and Fig. 2, a pinna or second leaf magnified, to shew the seed vessels and hairs.*

Hairy *Acrostichum* was first found to grow near the top of Snowdon, the highest mountain in Wales, by Dr. Lhwyd, who discovered it growing horizontally from the chinks of the rocks on *Clogwyn y Garnebb*.

Dr. Richardson found it on *Clogwyn y Garnebb*, near the top, on the side facing the north-west, directly above the lower lake. Mr. Hudson saw it in the same place. My figure was taken from a fine specimen gathered there, and now in the possession of a noble naturalist.

P T E R I S.

P T E R I S.

Lin. Gen. Plan. 1174.

PTERIS aquilina. *Sp. Plan.* 1533. *Ray Syn.* 124. *Flo. Scot.* 656.
Flo. Ang. 451. *Ger. Em.* 1128. *Park.* 1037.

T A B. X.

B R A K E S.

THE root, from the bottom of the stem, strikes down into the ground perpendicularly for three or four inches; afterwards is curved, and creeps horizontally in the ground, is there branched, hard, woody, and as thick as the little finger, covered with a black bark, and fibrous.

First leaves from one to three feet in height; stem or rib smooth, hard, of a pale green colour, and glossy; destitute of leaves for half its length from the root; general figure of the first leaves triangular.

Second leaves eight or ten pairs, placed opposite; their general shape triangular, and diminishing from the lowest to the highest.

Third

Tab. 10.



Pteris aquilina



Jun. in Bolton d. 1840

P T E R I S.

Lin. Gen. Plan. 1174.

PTERIS aquilina. *Sp. Plan.* 1533. *Ray Syn.* 124. *Flo. Scot.* 656.
Flo. Ang. 451. *Ger. Em.* 1128. *Park.* 1037.

T A B. X.

B R A K E S.

THE root, from the bottom of the stem, strikes down into the ground perpendicularly for three or four inches; afterwards is curved, and creeps horizontally in the ground, is there branched, hard, woody, and as thick as the little finger, covered with a black bark, and fibrous.

First leaves from one to three feet in height; stem or rib smooth, hard, of a pale green colour, and glossy; destitute of leaves for half its length from the root; general figure of the first leaves triangular.

Second leaves eight or ten pairs, placed opposite; their general shape triangular, and diminishing from the lowest to the highest.

Third

Tab. 10.



Pteris aquilina

James Bolton del. & sculp.

Third leaves eight or ten pairs, placed opposite, and diminishing from the lowest to the highest.

Lobes eight or ten pairs, divided down to the nerve, of an oblong figure, terminating in an obtuse point, the verges a little rolled back, and, while young, feeling downy to the touch.

Seed vessels disposed in lines under the edges of the lobes, (which is the characteristic of the genus,) at first white, afterwards brown ; when the seeds are discharged, the lines become broader and more conspicuous, but never cover the disk of the lobes, as all the acrosticha, and many of the asplenia do.

The plate represents a third leaf of the natural size with the seed vessels.

Brakes, (in Yorkshire, brackens,) grow about the skirts of barren moors, and in such waste places where the badness of the soil renders the ground not worth cultivating.

F

A S P L E N I U M.

A S P L E N I U M.

Lin. Gen. Plan. 1178.

A S P L E N I U M scolopendrium.

Linn. Spec. Plan. 1537. *Ray Syn.* 116. *Flo. Scot.* 660. *Flo. Ang.*
452. *Ger. Em.* 1138. *Park.* 1040.

T A B. XI.

H A R T S T O N G U E.

THE root is black, hard, covered with scales, and emitting numerous strong black fibres.

Leaves from five to twelve inches long, lance-shaped above, the two sides rounded at the bottom, so as to give a cordated appearance to the lower extremity of the leaf, and receiving the rib in the hollow dent; the rib is brown or blackish, hard, glossy, having brown chaffy scales, and is destitute of leaf about one-third of its length; the leaf is hard, tough, and firm to the touch, with numerous parallel veins running obliquely from the central nerve to the margin, of a dark shining green above, paler underneath, and often more or less undulated at the edge.

Seed

Tab. 11.



Asplenium scolopendrium

Seed vessels on the under side of the leaves, in lines running obliquely from the nerve to the margin; sometimes there are two series of these lines of seed vessels from the top of the leaf to the bottom, the lines of the inner series much larger than these of the outer one, all of them running parallel; often there is but a single series on each side of the rib; and sometimes the lower part of the leaf is barren.

When the seed vessels are ripe, and burst, the lines become broader, and seem covered with a brown dust. The seeds being disposed in lines on the prone disk of the leaf characterises the Genus *Asplenium*.

Harts Tongue grows amongst rocks; in the deep cliffs between the rocks in Whitescars and Scar Close near Ingleborough abundantly, where I have seen the leaves twenty-four inches long.

It grows in a little woody brow, called Toad-Holes, in Sowerby Dean, four miles from Halifax.

A S P L E N I U M ceterach.

Lin. Sp. Pl. 1538. *Ray Syn.* 118. *Flo. Scot.* 661.
Flo. Ang. 452. *Ger. Em.* 1139. *Park.* 1046.

T A B. XII.

S P L E E N W O R T.

THE root consists of many fibres adhering to a short shapeless head, which is surrounded thickly by the stumps of decayed leaves, and is of a dark-brown colour.

The leaves are from three to five inches long, semi-pinnate, and lance-shaped; the nerve brown towards the bottom, and naked for a little way from the root.

The lobes are about twenty pairs, short, broad, roundish, entire, but waved on the edges, largest in the middle of the leaf, diminishing gradually both upwards and downwards, the uppermost placed obliquely, all of them confluent, and decurrent at the base, of a dark shining green on the upper side; when the plant is old, the lobes of the leaf roll together inwardly, and hide their smooth surfaces.

Seed

Tab. 12.



Asplenium Ceterach.

Seed vessels make their first appearance in three or four short pale coloured lines, placed obliquely on the under side of the lobe near its middle nerve on each side.

As the plant advances in growth, the seed vessels enlarge, turn brown, and, when burst, run together and cover the whole disk of the lobes with their brown dusty filaments, as in the Genus *Acrostichum*.

Spleenwort is said to grow in the chinks of old walls and rocks about Bristol plentifully.

The specimen from which my figure was taken, I had from a person who told me he brought it from the lime rocks near Malham Tarn, in the place mentioned by Mr. Ray ; *see 3d synopsis, p. 118.*

ASPLENIUM.

A S P L E N I U M trichomanes.

Linn. Sp. Plan. 1540. *Ray Syn.* 119. *Flo. Scot.* 662. *Flo. Ang.*
452. *Ger. Em.* 1146. *Park.* 1051.

T A B. XIII.

E N G L I S H M A I D E N H A I R.

THE roots are very small, consisting of brown capillary fibres loosely affixed in the crevices of moist rocks.

Leaves five or six inches long; the rib of a blackish purple colour, smooth, hard, shining, and is destitute of leaf about one-third of its length from the root. The general figure is lance-shaped.

Lobes fifteen or twenty pairs, the lowest pairs most remote, the rest nearer and nearer by a slow gradation to the top, all of them placed opposite; their figure approaches to an oval, largest below, gibbous on the upper side at the base, and obliquely cut off on the lower, rounded or blunt at the extremity; the lobe is crenated with ten or twelve dents, its base above and below entire.

Seed

Tab. 13,



Asplenium Trichomanes

Seed vessels make their first appearance in two or three white lines placed obliquely on each side of the nerve on the back of the lobes ; when they are advanced in growth the colour becomes darker ; at last they burst, discharge the seeds, and spread themselves, but not so as to cover the whole disk.

V A R I E T I E S.

There is a variety of this plant in which the lobes are subdivided, and the subdivisions elegantly crenated and lobed, *see Tab. 2. Fig. 2.* but this variety is rare.

English Maiden Hair grows from the crevices of moist rocks, near rivulets, on Snowdon and Ingleborough ; on rocks about Ogden Kirk ; on the moist rocks near the Pitcher Pit, in Soyland Mills Clough ; and other places in the neighbourhood of Halifax.

A S P L E N I U M

A S P L E N I U M viride.

Hud. Flo. Ang. 453. *Ib. Ed. prim.* 385. *Flo. Scot.* 663.

T A B. XIV.

L E S S E R E N G L I S H M A I D E N H A I R.

THE root is small, short, covered with brown scales, and furnished with a multitude of capillary entangled brown fibres.

Leaves simply pinnate, four or five inches long, lance-shaped, but somewhat narrow; the ribs tender, often of a pale green colour, sometimes brownish towards the root. I have specimens, wherein the bottom part of the rib is brown and glossy, as in the *Asplenium trichomanes*.

The lobes eighteen or twenty pairs, sometimes alternate, sometimes opposite, short, broad, of a rhomboidal figure, or irregular square of four unequal sides, attached to the rib by one of the angles, the upper and lower sides of the base entire, the other two crenated, the upper with six or seven dents, the lower with four or five.

Seed

Tab. 14.



Asplenium Viride



Seed vessels first appear in two or three white oblong spots on the under side of the disk about the centre; they afterwards turn of a yellowish brown, and, when burst, become confluent, covering the central part of the disk with a brownish nap; which last circumstance, together with the figure of the lobes, are sufficient to characterize the species, and to distinguish it from the *Asplenium Trichomanes*.

VARIETIES.

I have seen a variety of this plant with the leaves branched, the rib of the first leaf throwing out other ribs furnished with lobes like the first, but smaller: this variety I gathered on the rocks below Ogden Kirk, on the opposite side of the Clough, A. D. 1783.

Is this variety the *Asplenium Trichomanes ramosum* of Linnæus?
see Tab. 2. Fig. 3.

Green Maiden-Hair grows on Ingleborough Hill in Yorkshire; on the mountains of North Wales abundantly; from the chinks of moist rocks, beside the Clough below the Great Rock called Ogden Kirk, four miles from Halifax.

A S P L E N I U M marinum.

Sp. Pl. 1540. *Ray Syn.* 119. *Flot. Scot.* 664. *Flo. Ang.* 453-
Ger. Em. 1143. *Park.* 1045.

T A B. XV.

S E A S P L E E N W O R T.

THE roots are brown, tough, and hard, full of fibres, and firmly fixed in the narrow chinks of the rocks.

The leaves are simply pinnate, five or six inches long, lance-shaped, blunt at the base; the rib hard, firm, of a purplish black, smooth and shining; upper side a dark full green, paler below.

Lobes from seven to twenty pairs, oblong, with a remarkable expansion on the upper margin near the base, and on the lower side obliquely cut off; base, both above and below the nerve, entire; extremity of the lobes rounded or bluntly terminated; all except the base crenated on the edges, with fifteen or sixteen dents on the upper side of the nerve, nine or ten on the lower.

Seed

Tab. 15.



Asplenium marinum



Seed vessels placed in lines on the under side of the lobes, four or five of these lines on each side of the nerve running obliquely.

In this, as in all other aspleniums, the seed-lines, when burst, become broader, but do not in this species, as in several, cover the whole under side of the lobes.

V A R I E T I E S.

The Rev. and ingenious Mr. Lightfoot observed a variety of this plant in the caves at Weems, in Scotland, which he supposes to be the same as described by Sibbald in his *Scotia Illustrata*, p. 7, part 2; and which the author of the *Flora Anglica* has named *Adiantum trapeziforme*. For the satisfaction of the curious I have copied Sibbald's figure; *see Tab. 2. Fig. 4.*

Sea Spleenwort is said to grow on rocks in the Isle of Anglesea; about the shores of Suffex, Devonshire, Cornwall and Cumberland. The specimen from which I took my figure and description, I gathered from a rock in the side of a stone pit, or quarry, close by the road leading from Warrington to Winwick, in Lancashire.

A S P L E N I U M ruta-muraria.

Lin. Sp. Pl. 1541. *Ray Syn.* 122. *Flo. Scot.* 665.
Flo. Ang. 453. *Ger. Em.* 1144. *Park.* 1050.

T A B. XVI.

WALLRUE MAIDEN - HAIR.

THE roots are small and hard, furnished with short fibres, infinuating themselves deeply in the narrow chinks of dry rocks and the walls of old buildings.

Leaves three or four inches high, narrow as a thread, half their length from the root naked, the upper part branched in an irregular alternate order, each branch carrying two or three lobes, of a very dark green above, paler underneath.

Lobes short, broad, with four unequal sides, adhering to the footstalk in an acute angle; the two sides next the base entire, the two exterior sides finely crenated on the edges with numerous small dents.

Seed.

Tab. 16,



Asplenium trichomanes



Seed vessels first appear in white longish dots on the under side of the lobes, two or three on each side the nerve, placed obliquely ; when the seeds are ripe the vessels burst, enlarge, and joining each other at their margins cover the central part of the disk, the margins only being uncovered.

There is a variety with small leaves taken notice of by Mr. Ray in 3d syn. p. 123.

Wallrue Maiden-Hair grows from the chinks of dry rocks in the North of England, and on the mountains of Wales abundantly ; on rocks in the Eves near Heptonstall ; on Sowerby Bridge, two miles from Halifax. The leaves grow first horizontally, then curve gradually upwards.

ASPLENIUM

A S P L E N I U M adiantum - nigrum.

Sp. Plan. 1541. *Ray Syn.* 126. *Flo. Scot.* 666. *Flo. Ang.* 454.
Ger. Em. 1137. *Park.* 1406.

T A B. XVII.

B L A C K M A I D E N H A I R.

THE roots are long, large, and black, furnished with many long fibres, by which it fixes itself so firmly in the places where it grows that it is with great difficulty dug out.

First leaves from five to ten inches in length; rib black, glossy, and naked for half its length from the root; figure of the leafy part tapering, broadest below, diminishing gradually to the top.

Second leaves ten or fifteen pairs, opposite or alternate, triangular, broad at the base, tapering to the point, of a fine bright glossy green above, paler underneath.

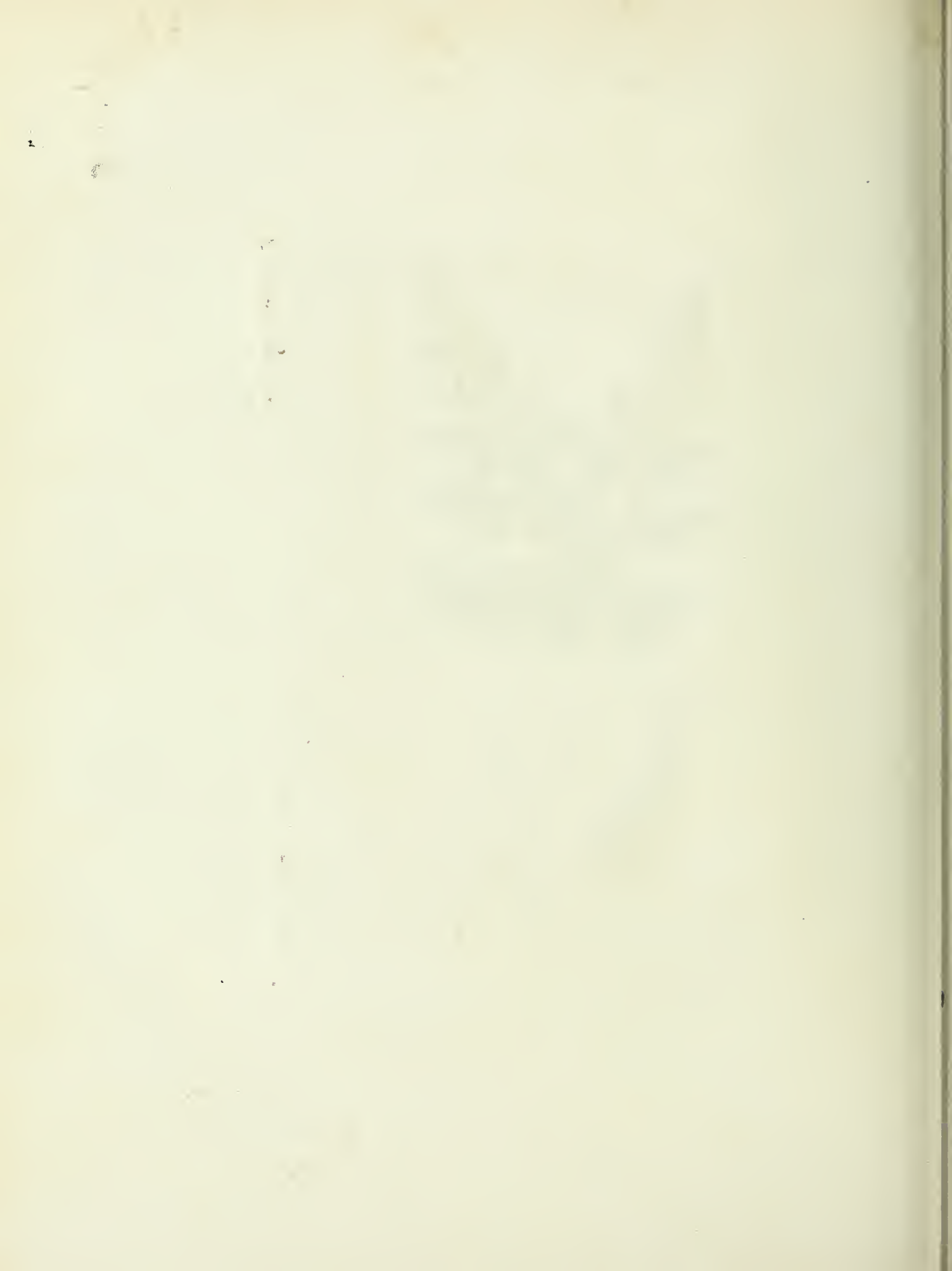
Lobes from four to seven pairs, one or two of the first pairs divided down to the nerve of the second leaves; in luxuriant and full-grown specimens these lobes are again partly lobed, the other pairs becoming gradually confluent at the top of the second leaves.

The

Tab. 17



Asplenium Adnigrum-veigii.



The first lobe on the upper side grows erect, and close to the rib of the first leaf, on the under side it inclines obliquely outwards; all of them entire on the two sides near the base, the rest finely crenated.

Seed vessels appear in white oblique lines on the back of the lobes, afterwards become brown, and, when burst, enlarge and cover the central part of the disk; *see Tab. 17. Fig. 3.*

V A R I E T I E S.

I gathered a variety of this plant on an old wall near the village of Wharf in Yorkshire; leaves not broader below than in the middle, lance-shaped; second leaves alternate, remote, tapering; lobes divided down to the middle rib, of a roundish figure and deeply crenated at top; *see Tab. 17. Fig. 2.*

Is this the *Asplenium lanceolatum* of Mr. Hudson? *see Flo. Ang. 2nd Edit. p. 454. No. 8.*

Black Maiden Hair grows from the chinks of rocks and old walls in the West-riding of Yorkshire, and in Wales.

The specimen figured and described I gathered on the rock near the head of the vale of Clyde, in Denbighshire, where the *Lichen filiquosus* grows.

POLIPODIUM

P O L I P O D I U M.

Lin. Gen. Plan. 1179.

P O L I P O D I U M vulgare.

Sp. Pl. 1544. *Ray Syn.* 117. *Flo. Scot.* 667. *Flo. Ang.* 455.
Ger. Em. 1132. *Park.* 1039.

T A B. XVIII.

P O L I P O D Y.

THE root is long, crooked, branched, creeping horizontally under the moss, here and there emitting a few fibres.

The leaves rise singly at small distances from four to ten inches high; they are simply pinnate, lance-shaped, and of a beautiful green, destitute of lobes one-third of their length from the root, and of a firm dry substance.

Lobes fifteen or twenty pairs; a few of the lowest pairs increasing gradually upwards, then diminishing to the top, where they become confluent, terminating the leaf in an entire point; they are tongue-shaped, entire on the edges, and bluntly rounded off at the extremity.

. Seed

Tab. 18.



Polypodium Vulgare.

Seed vessels placed in round dots on the back of the lobes, three or four in a row on each side the nerve, from a pale green gradually changing to a brown orange colour.

V A R I E T I E S.

The *Polipodium cambricum* is now known to be a variety of this plant. The general shape of its leaves oval ; lobes confluent, and decurrent at the base, irregularly gashed on the edges, the segments long, narrow, crowded, serrated or crenated on the edges, the whole leaf thin, smooth, semi-transparent, of a pale green and very elegant. *See the figure of a lobe, Tab. 2. Fig. 5. a.* This variety produces no seed vessels.

There is another remarkable variety in which the lobes are proliferous, having other lobes growing from their sides ; *see Tab 2. Fig. 5. b.* This variety was discovered in fructification in a wood near Bingley by Mr. W. Alexander, of Halifax, in August 1782.

Polipody grows on old mossy walls, rocks, and about the roots of old trees in shady places.

POLIPODIUM lonchitis.

Sp. Pl. 1548. *Ray Syn.* 118. *Flo. Scot.* 668. *Flo. Ang.* 456.
 Ger. Em. 1140. *Park.* 1042.

T A B. XIX.

GREAT SPLEENWORT.

THE roots are thick, hard, compact and woody, covered with brown scales, very fibrous, and have many stumps of decayed leaves remaining upon them.

Leaves from five to ten inches long, simply pinnate, perfectly lance-shaped, and of a bright and beautiful green; their substance hard and dry; the rib covered with chaffy scales of a pale brown.

Lobes from fifteen to twenty-five pairs, placed alternately, the lowest pairs short, remote, the rest growing gradually nearer to the top; they are of an irregular lunated figure, having an ear-like process on the upper edge near the base, the lower edge obliquely cut off at the base; the body of the lobe curving upwards, the base both above and below the nerve entire, the rest doubly serrated, the larger serratures terminating in sharp spines.

Seed

Tab. 19.



Polypodium Lonchitis.

Seed vessels placed in round dots on the plane disk of the lobes on the under side, eight or ten in a row on each side the nerve, white at first, of a yellowish brown colour when ripe, the lobes on the lower half of the leaf generally barren.

Polipodium lonchitis very greatly resembles the *Polipodium aculeatum* in some of its states, particularly that variety of it which Hudson calls *Polipodium lobatum*, which I have figured Tab. 26. Fig. 2. These two plants in figure, colour, substance, manner of growth and general habit, bear a resemblance too striking to be disregarded.

The *Polipodium aculeatum* and *lobatum* are found growing on moist rocks and shady places. *Polipodium lonchitis* on the cold mountains of North Wales. Is it possible that *Polipodium lonchitis* should be a starved variety of *Polipodium aculeatum*?

Polipodium lonchitis grows on Snowdon; near the foot of *Crib y Destilb*, issuing from the chinks of the rocks; also on the rocks of *Glydar*, near Llanberris, where I gathered the specimen here figured and described.

P O L I P O D I U M phegopteris.

Sp. Pl. 1550. *Ray Syn.* 122. *Flo. Scot.* 669. *Flo. Ang.* 456.

T A B. XX.

W O O D P O L I P O D Y.

THE roots are long, crooked, branched, and creep under the moss in the moist part of dark and shadowy woods, emitting a few fibres into the crumbly mould as they creep along.

First leaves from six to twelve inches high; rib a little chaffy, naked more than half its length from the root; general outline of the leaf triangular, tapering from the base to the point; colour a dark fuscous green; rib slender, round, pellucid.

Second leaves eight or ten pairs, sometimes opposite, lowest pair the largest, thence diminishing to the top.

Lobes ten or twelve pairs; the lowest pair shortest, united on its outer edge to the next lobe, on its inner to the rib of the first leaf, and is decurrent;

Tab. 20.



Polypodium phegopteris.



rent ; *see Tab. 20. Fig. 2.* The other lobes distinct for three or four of the first pairs, near the extremity become confluent, terminating the second leaf in a crenated point. The lobes on one or two of the largest second leaves are irregularly crenated ; lowest pair of the second leaves wants the short decurrent lobe at the base.

Seed vessels in small dots on the margins of the lobes near their divisions, two, three, or four on each side, at first white, afterwards of a pale brown, lastly black.

Wood Polipody grows in the moist part of shadowy woods, in the West Riding of Yorkshire in many places ; in a little wood in Soyland, just by the brook below Kebroyd-Mill plentifully ; and in a little shadowy range of wood ground near the brook above Oldhouse-Mill, Norland, two miles from Halifax.

The whole plant is of a dark fuscous green ; whilst young a little downy, and feels soft to the touch ; to the lower part of the rib adhere a few chaffy pale brown scales.

P O L I P O D I U M

P O L I P O D I U M fontanum.

Sp. Plan. 1550. *Flo. Ang.* 456.

T A B. XXI.

F O U N T A I N P O L I P O D Y.

THE first leaves three or four inches long, lance-shaped, narrow at the top; rib smooth, naked about an inch from the root, and of a pale green colour, of an hard and dry substance.

Second leaves twelve or fifteen pairs, alternate, of an oval figure, broad at the base, and bluntly pointed.

Lobes three or four pairs, opposite, divided down to the nerve, of a roundish figure, and crenated with three or four dents, flowing together at the extremity of the second leaf.

Seed vessels make their first appearance in small dots on the back of the lobes; when they burst, they flow together and overspread the whole disk. Dr. Hill, in his *Flora Britannica*, page 530, tab. 3, gives a bad figure of this plant for the *Acrostichum Ilvense*.

Fountain

Tab. 21.



*Polypodium
fontanum.*

J. K. 1785

Fountain Polipody is said to grow on old walls and rocks above Hammerham church; in stony places near Waybourn in Westmorland. The Specimen here figured and described was sent to my brother, A.D. 1775, by a gentleman who gathered it in Buckinghamshire, and mistook it for the *Acrostichum ilvense*.

POLIPODIUM

P O L I P O D I U M thelypteris.

Flo. Ang. 457. *Flo. Scot.* 674. *Ray Syn.* 122. *Ger. Em.* 1135.
Park. 1041.

T A B. XXII.

M A R S H P O L I P O D Y.

THE roots are long, large, and furnished with innumerable long fibres, which spread under the surface, and take fast hold of the mire in which it grows.

First leaves from one to two feet in length, lance-shaped, broadest in the middle, thence gradually decreasing upwards, and terminating in an acute point.

Second leaves from fifteen to thirty pairs, opposite or alternate, below more remote, upwards growing gradually nearer each other, and, near the top, running together at their base.

Lobes about fifteen pairs, not divided quite down to the nerve, of an oblong figure, broadest at the base, ending in an obtuse point, and entire on the edges, lowest pair the largest, thence diminishing to the top, where they become confluent, and lose themselves in the acute termination of the second leaf.

Seed

Tab. 22.



Polypodium thalypteris.

113.

Seed vessels placed in dots on the under margin of the lobes, tab. fig. d; at first of a whitish colour, and distinct; when ripe, they burst, turn brown, flow together, and cover the whole disk of the lobe, except the middle nerve, fig. 3. From this last circumstance, the plant was formerly taken for an *Acrostichum*; see *Lin. Sp. Pl.* 1528. No. 25.

The young roots are barren, the leaves arising from them are six or eight inches high, all the parts fewer, their substance thin, light, tender and delicate, fig. 1. In this state it is accurately described by the ingenious John Goodyer; see *Ger. Em.* p. 1135.

Marsh Polipody grows in moist marshy grounds about the borders of moors, woods and rivulets. It grows at the bottom of a little wood near the rivulet directly below the cottages in Birks-lane, half a mile from Halifax; in the top of a four field under North Dean Wood, Norland; and about Cob Clough near Ripponden plentifully.

I suspect the *Polipodium fragrans* of Mr. Hudson to be a variety of this plant, where the seeds, accidentally taking root on rocks, produce small plants having the parts crowded. Linnæus's description of the *Polipodium fragrans*, see *Mantissa*, 2, 307, agrees with *Polipodium thelypteris* in every thing but magnitude. If *Polipodium fragrans* is a real species, I shall be thankful to any one who will communicate a fair specimen, or give hints of information concerning it.

P O L I P O D I U M cristatum.

Sp. Pl. 1551. *Ray Syn.* 124. *Flo. Scot.* 670. *Flo. Ang.* 457.
Ger. Em. 1129.

T A B. XXIII.

C R E S T E D P O L I P O D Y.

THE root is a short mis-shapen lump, furnished with a multitude of long, brown, divided, and subdivided fibres.

First leaves from six to thirty inches high ; the rib thinly covered with brown chaffy films, destitute of leaf for more than half its length ; general figure of the leaf triangular, tapering upwards to a point.

Second leaves from nine to fifteen or twenty pairs, placed opposite or alternate ; of a triangular figure tapering to the extremity.

Third leaves from seven to fifteen pairs, of an oblong shape, but tapering to a point ; those which grow on the lower side of the rib of the second leaf larger than those which grow on the upper.

Lobes.

Tab. 23.



Polypodium cristatum.

Ad. 1785.



Lobes nine or ten pairs, of an oval shape, deflected, lowest pairs largest, divided down to the nerve; the others gradually run together at the extremity, and lose themselves in the point of the third leaf, all of them serrated and spiny on the edges.

Seed vessels placed in round dots in the back of the lobes, two or three on each near the divisions; they are at first white, afterwards brown, and at last turn blackish.

V A R I E T I E S.

There are two varieties of this plant; one, in which the lowest pair only of second leaves are so subdivided as to produce third leaves having distinct divided lobes. From a specimen of this kind my figure was taken. In the other variety, several of the lower pairs of second leaves are thus subdivided.

Mr. Hudson seems to suspect that the *Polipodium rheticum* is a small variety of this plant.

Crested Polipody grows from the chinks of moist rocks and old walls in steep and craggy woods every where in the parish of Halifax; particularly in Birks Wood, and Lee Bank shrogs, abundantly.

P O L I P O D I U M Filix-mas.

Lin. Sp. Pl. 1551. *Ray Syn.* 120. *Flo. Scot.* 671. *Flo. Ang.* 458.
Ger. Em. 1130. *Park.* 1036.

T A B. XXIV.

M A L E F E R N.

THE root is large, long, firm, and woody, surrounded on the outside with thick brown scales in an imbricated order, and furnished with many long black tough fibres.

The first leaves from one to four feet in length ; when young, the rib is thickly covered with brown tough transparent scales of an oblique oval lance-shape ; the general figure of the leaf is lance-shaped, broadest in the middle, and thence gradually decreasing to each extremity, and terminating above in an acute point.

Second leaves from fifteen to forty pairs, remote on the lower part, growing gradually nearer upwards, and running together at the top.

Lobes from seven to fifteen pairs, the lowest pair largest, decreasing upwards till they run together and lose themselves in the point of the second leaf,

Tab. 24.



Polypodium Filix-mas.

leaf, their shape oblong, rather broader at the base, blunt at the extremity, and more or less serrated or crenated on the edge, particularly at the upper extremity.

Seed vessels in two rows placed on the back of the lobes on the plane of the disk, one row on each side the nerve, in number from three to six, kidney-shaped, covered with a pellicle; they are at first white, then change to a bluish or ash colour; when the seeds are ripe the pellicle bursts, and, after the discharge of the seeds, the vessels become brown, and appear as if covered with dust, but do not run together as in the *Polipodium thelypteris*.

The certain characters of distinction between *Polipodium Filix-mas*, and *Polipodium thelypteris*, are these: in the first, the lobes are broad at the extremity, and serrated; the seed-vessels are kidney-shaped, and placed on the plane disk of the lobes; in the last the lobes are obtusely pointed, and entire on the edges; and the seed vessels placed in rows of small round dots close to the margin of the lobes.

Male Fern grows about the borders of woods near rivulets, and in stony and rocky places about Halifax abundantly.

POLIPODIUM

P O L I P O D I U M Filix-femina.

Sp. Pl. 1552. *Ray Syn.* 121. *Flo. Scot.* 673. *Flo. Ang.* 458.
Ger. Em. 1130. *No.* 3.

T A B. XXV.

F E M A L E F E R N .

THE roots are large, hard, and woody, covered with brown tough scales, very fibrous, and taking firm hold in the ground.

The first leaves from one to four feet high ; the rib smooth, furrowed on the upper side, round or gibbous on the under, gently waved near the top for the insertion of the second leaves, while young a few chaffy brown scales on the lower part ; the general outline of the leaf lance-shaped, broad in the middle, acutely pointed above.

Second leaves from fifteen to forty pairs, broadest at the base, thence gradually diminishing and terminating in a fine extended point ; pairs placed more remote below, the first three inches from the next, coming nearer each other gradually upwards ; near the top the triple division ceases, the third leaves are lost in the second, and the second in lobes which terminate the whole in a fine feathered point.

Third

Tab, 25,



Polypodium Filix-samaria.

J.B.

Third leaves from twenty to thirty-five pairs, placed nearly opposite, lowest pair largest, diminishing upwards till they are lost in the termination of the second leaves.

Lobes ten or twelve pairs, opposite, a few of the first pairs divided down to the nerve, confluent at the point, where they are lost in the blunt crenated termination of the third leaf; they are of an oblong figure, blunt at the extremity, where they are deeply crenated with three or four dents.

The number of these lobes, on a large and well-grown leaf, I have found to exceed five and thirty thousand; the whole of a fine green; the substance light, tender and very delicate, and in point of beauty and elegance much superior to any other of the British ferns.

Seed vessels in round dots, one on each lobe near the division at its base, at first white, afterwards green, and at last brown.

My figure is reduced by a scale of twenty-four supposed inches, on six inches of the standard foot. The branch, with seed vessels, is taken from a small, or middle-sized specimen, and, drawn of its natural bigness.

Female Fern grows in the moist part of rocky woods, and about brooks and rivulets in the West-riding of Yorkshire. In rocky moist places beside Lee Beck near Halifax plentifully.

POLIPODIUM

P O L I P O D I U M aculeatum.

Lin. Sp. Plan. 1552. *Ray Syn.* 121. *Flo. Scot.* 675. *Flo. Ang.* 459.
Ger. Em. 1130.

T A B. XXVI.

P R I C K L Y P O L I P O D Y.

FIRST leaves from one to two feet in length, of a true lance-shape, broadest in the middle, decreasing gradually and slowly toward the extremities, being somewhat broader at bottom than at top; the rib channeled on the upper side, round below, and closely covered with brown chaffy filmy scales; substance hard, rigid, dry; colour a dark green.

Second leaves from twenty to forty in number, one or two of the lowest pairs placed opposite, becoming gradually alternate upwards, separate from each other quite to the top, the lowest pair a little more remote than the next above, by an easy gradation growing nearer and nearer to the top, all placed at an acute angle with the middle rib, and curving upwards from the base to the point.

Lobes from eight to twenty, a few of the first pairs divided down to the nerve, they thence gradually become confluent, and lose themselves in the acute

Tab. 26.



Polypodium aculeatum

acute prickly termination of the second leaf; first lobe on the upper side largest, of an oblique ear-shape, erect, terminating in a sharp spine, has a kind of projection or appendage on the outer side in the broadest part, which, as well as the little projections on both sides, terminates in a small sharp spine; the other lobes on the upper side approach to this in shape, but are smaller, spiny and erect; lobes on the lower side obliquely ear-shaped, grow in an horizontal direction, making a very acute angle with the nerve, and, like those above, are armed with sharp spines.

Seed vessels placed in rows, *Tab. 26. Fig. 3.* on the plane disk of the second leaves; near the top of the plant there are only two regular rows one on each side the nerve; lower down they are placed on the lobes, somewhat irregularly, from one to five on each, (*see Fig. 3.*) lower half of the first leaf barren.

The *Polipodium lobatum*, Hall. Hist. 1712, and Flo. Ang. 459, is doubtless a young plant of *Polipodium aculeatum*; of this I am certain from observation, *see Tab. 26. Fig. 2. see also Flo. Scot. p. 676.*

Polipodium aculeatum grows from the fissures of rocks in damp places; on rocks near the bottom of Benroyd Clough, Norland; and in a little wood called Toad-Holes, in Sowerby Dean, both near Halifax.

P O L I P O D I U M fragile.

Sp. Plan. 1553. *Ray Syn.* 125. *Flo. Scot.* 677. *Park.* 1043.

T A B. XXVII.

B R I T T L E P O L I P O D Y.

THE body of the root consists of the stumps of old leaves which remain undecayed for a considerable time in the ground; they are covered with brown scales, and furnished with many fibres below, taking firm hold in the place where it grows.

The first leaves from five to nine inches high; the rib smooth, slender, and brittle, at first of a pale green colour, when old of a purplish brown, and glossy, naked for about one-third part of their length from the ground; outline of the first leaf lance-shaped, broader at the base, narrow at the point.

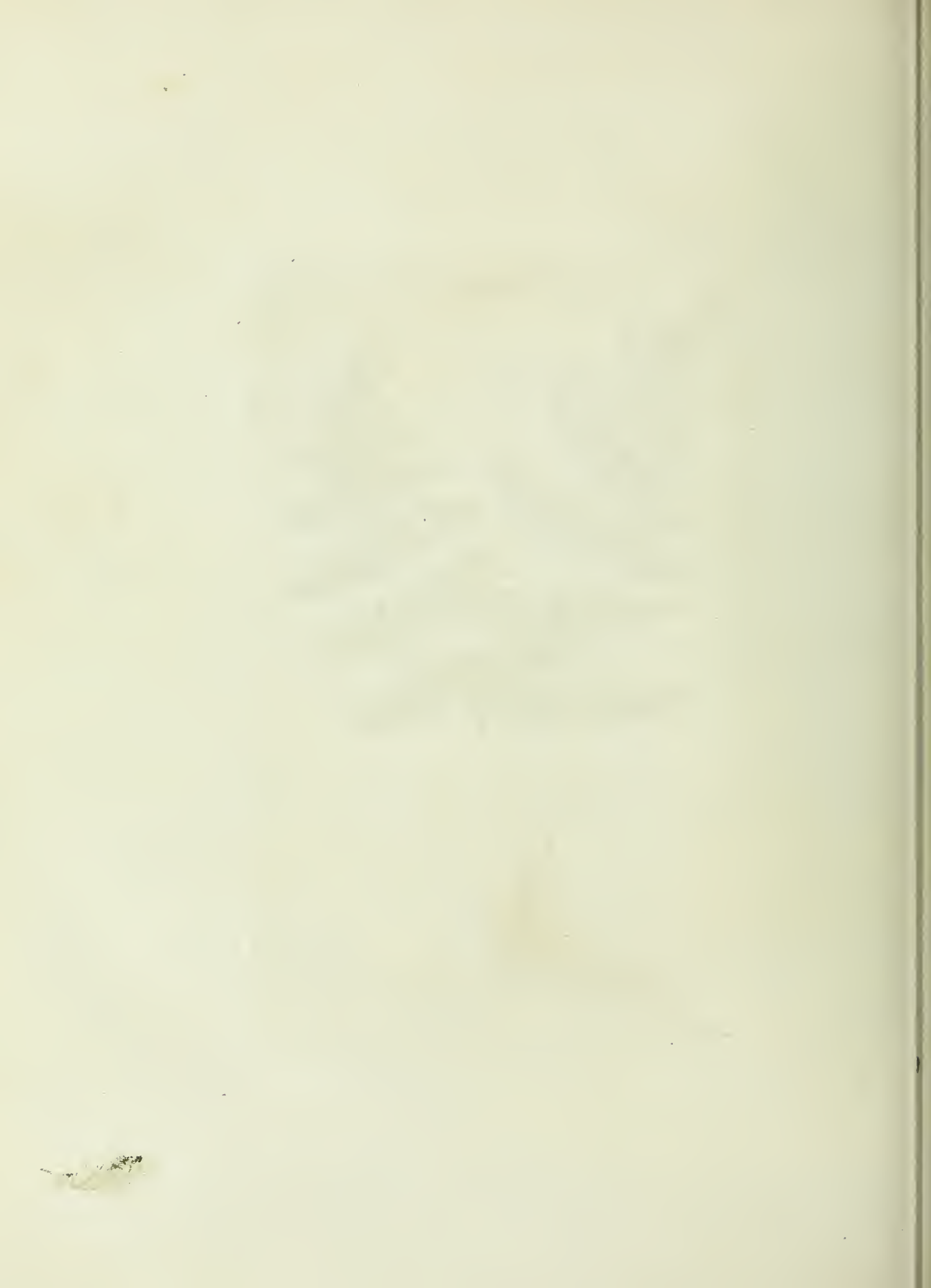
Second leaves eight or ten pairs placed opposite, remote, broadest at the base, gradually diminishing in breadth to the extremity, and drawing nearer and nearer each other to the top of the first leaf.

Lobes

Tab. 27,



Polypodium fragile



Lobes fix or seven pairs, placed opposite, distant from one another below, growing nearer each other to the top of the second leaf, where they run together in the point of it; their figure is oval, and they are crenated round the edge with eight or ten distinct dents.

The dots of feed vessels are placed on the under disk of the lobes, two or three in a row on each side of the nerve, at first white, at last brown, and, when burst, run together, and cover the disk of the lobes, except the margin only.

V A R I E T I E S.

I have seen a variety of this plant, growing in moist and very shady situations, as in the deep fissures of moist rocks where the sun was excluded, or where it was over grown and shadowed with other plants, wherein the leaves were more tall and slender than the above described; the rib of a pale green, the second leaves more remote, the lobes narrower, and the whole plant more light, transparent, and delicate; this is undoubtedly the *Polipodium Rheticum* of Linnæus, *see Flo. Scot.* 679, *and my Fig. Tab. 2. Fig. 6.*

Brittle Polipody grows from the fissures of rocks about Ingleton and Settle, in Yorkshire; about Castleton and other places in the high Peak, Derbyshire; on Snowdon in Caernarvonshire, North Wales, abundantly.

P O L I P O D I U M dryopteris.

Sp. Pl. 1555. *Ray Syn.* 125. *Flo. Scot.* 678. *Flo. Ang.* 640.
Ger. Em. 1135. *Park.* 1043.

T A B. XXVIII.

B R A N C H E D P O L I P O D Y.

THE roots are long, crooked, knotty, and creep under the moss, emitting slender fibres as they creep along.

The first leaves rise singly at distances from the root; the rib round, slender, dark green, and semi-transparent, naked about three-fourths of its length from the root, and about eight inches high; the general figure of the leaf triangular.

Second leaves eight or nine pairs, the lowest pair twice divided, so as to produce third leaves, the other pairs simply pinnated, placed opposite at the base where they are broadest, and terminate gradually in a point.

Third leaves six or seven pairs, placed opposite, broadest at the base, pointed at the top, larger on the lower side of the nerve of the second leaf.

Lobes.

Tab. 27.



Polypodium Dryopteris

A D I A N T U M. Lin. Gen. Pl. 1180.

A D I A N T U M Capillus-veneris.

Sp. Pl. 1559. *Ray Syn.* 123. *Flo. Scot.* 679. *Flo. Ang.* 460.
Ger. Em. 1143. *Park.* 1049.

T A B. XXIX.

T R U E M A I D E N - H A I R.

THE root is short, simple, and furnished with many black fibres.

First leaves five or six inches high ; rib of a black purple colour, slender, very bright and glossy, naked almost half its length from the root ; general outline of the leaf approaching to an oval.

Second leaves about three on each side, in an unequal alternate order, an inch and half long, composed of six or seven lobes, generally supported on single short filiform footstalks ; sometimes these footstalks are again divided and support two lobes.

Lobes fan-shaped, narrow at the base, entire on the outer edges, broad and rounded at the extremity, where they are divided into four or five lobes or segments, which are of a membranaceous substance and turn backwards.

Seed

Tab. 29.



Charitum Capillus Veneris

175.3



Seed vessels placed in lines or oblong spots on the upper margin of the lobe, and covered by the thin segments which are bent back upon them ; at first of a white colour, covered with a membrane which bursts when ripe, after which the vessels are brown and appear dusty.

For ADIANTUM trapeziforme, which follows the above in Flo. Ang, and which is now found not to be a British plant, *see page 27.*

True Maiden-Hair is said to grow on moist rocks and walls at Barry-Island, and Porth-Kirig, in Glamorganshire. The specimen from which I took my figure and description grew amongst the extensive collection of rare and valuable plants in the rich and beautiful garden of the worthy John Blackburne, Esq; of Orford, near Warrington, Lancashire.

TRICHOMANES

TRICHOMANES. Lin. Gen. Pl. 1181.

TRICHOMANES pyxidiferum.

Lin. Sp. Pl. 1561. *Ray Syn.* 127. *Tab.* 3. *Fig.* 4, 5. *Flo. Ang.* 461.

T A B. XXX.

CUP TRICHOMANES.

THE roots are slender, filiform, branched, creeping, and furnished with innumerable extremely short and erect fibres, by which it adheres to and creeps along the moist rocks in the dark caverns where it grows, just as the slender shoots of ivy creep along a wall or the bark of a tree.

First leaves two or three inches long ; the rib like an hair, with a membrane on each side formed by the decurrency of the second leaves ; outline of the leaves a long oval, more pointed above, leaves rising at distances from the creeping root.

Second leaves four or five pairs, placed alternate, largest below, gradually diminishing to the top.

Lobes

Tab. 30,



Trichomanes pyxidiflorum.



Lobes two or three pairs, alternate, gashed in two or three segments, which are obtuse at their extremities, and some of them indistinctly waved or crenated on the edges; substance, a thin, light, pellucid, dark-green membrane, with a black hair-like nerve running up the middle quite from the root to the top along the middle of the first and second leaves the lobes and their segments. In the drawing and engraving of my figure, I have been painfully exact. The figure above referred to in Ray's Synopsis is of a first leaf very greatly exaggerated.

Seed vessels, none ever discovered upon this *Phenomenon* of a plant.

First discovered by Dr. Richardson in a little dark cavern, under a dripping rock, a little below the spring of Elm Cragg Well, in Bell Bank, scarce half a mile from Bingley. In this place I saw it in plenty in the year 1758: afterwards some alterations being made about the well, for the convenience of the proprietor, the cavern was destroyed, the plant perished, and was lost to Great-Britain till the year 1782; at which time being engaged in this work, and passionately desirous to see the plant again in its growing state, after several researches in Bell Bank, I found a root under a dripping rock, to the left side of the current, and about fifteen yards above the cistern. From this root I have sent specimens to one or two of my friends, and have in my possession the best of them, from which this figure and description was taken.

TRICHOMANES tunbrigense.

Sp. Pl. 1561. *Ray Syn.* 123. *Flo. Scot.* 681. *Flo. Ang.* 461.

T A B. XXXI.

TUNBRIDGE TRICHOMANES.

R OOTS slender, filiform, branched, furnished with very short black fibres by which they creep along.

First leaves one or two inches high, rising singly and at distances from the root; rib hair-like, black, with a membrane on each side, formed of the decurrent part of the second leaves; general outline of the first leaf, oval, narrowest towards the top.

Second leaves two or three pairs, alternate, placed distant, decurrent, or with their bottoms running down the nerve of the first leaf.

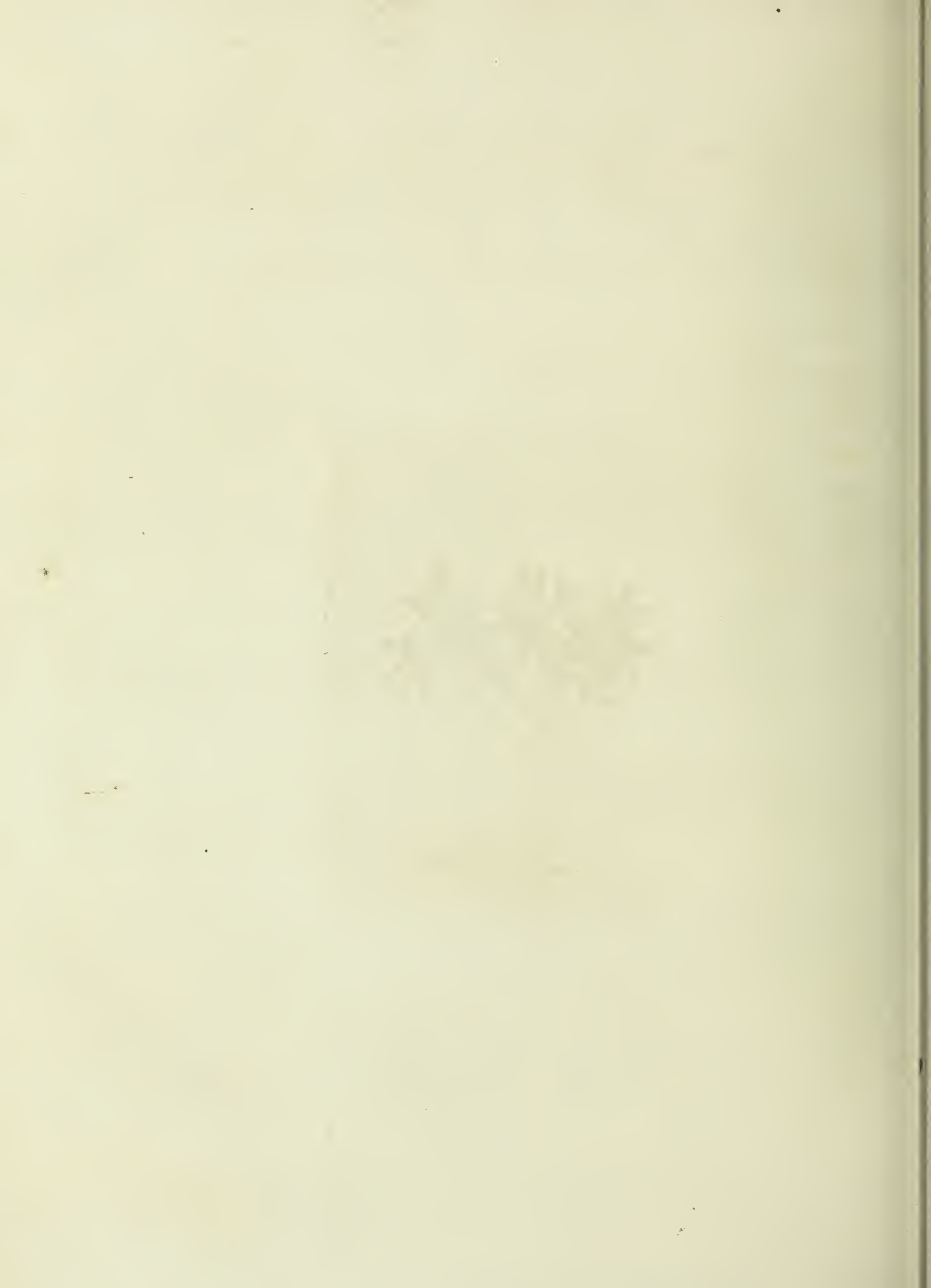
Lobes two or three pairs, alternate, sometimes simple, most commonly divided into two or three segments, of a longish oval shape, blunt at the extremity, sometimes (not always) ferrated or crenated on the edges, decurrent to the nerve of the second leaf; substance thin, delicate, tender, and transparent, except the middle nerve, which is hard, black, fine as an hair, and runs along the central part of the first leaf, and all its divisions.

Seed

Tab. 31.



Trichomanes lunifolium. J.B.



Seed vessels, globular, size of a small mustard-seed, supported on an hair-like footstalk a line in length, and arising from the edge of the decurrent part of the membrane at the original of the second leaves.

V A R I E T I E S.

I suspect the *Trichomanes pyxidiferum* of Bell Bank to be a luxuriant variety of this plant; their figure, texture, colour, and whole habit are the same, only differing in magnitude. In this opinion I am confirmed by observation; for in the year 1784, I found the *Trichomanes tunbrigense* growing in great plenty on the rocks under Dolbadon Castle, near the lake of Llhanberris; in cavities where the rock was moist, and overshadowed with other plants, so as to exclude the sun, I found specimens so far approaching to the *Trichomanes pyxidiferum*, as to form a connecting link between it and the *Trichomanes tunbrigense*, partaking equally of the one and of the other; one of these specimens I have exactly figured *Tab. 2. Fig. 7.*

Trichomanes tunbrigense grows on mossy rocks in the West-Riding of Yorkshire; particularly on the rock called Foal Foot, on Ingleborough-Hill. On the Welch mountains plentifully.

F I N I S.

L A T I N I N D E X.

	Page
<i>Acrostichum septentrionale</i>	12
<i>Acrostichum ilvense</i>	14
<i>Adiantum trapeziforme</i>	27, 55
<i>Adiantum capillus veneris</i>	54
<i>Asplenium scolopendrium</i>	18
<i>Asplenium ceterach</i>	20
<i>Asplenium trichomanes</i>	22
<i>Asplenium viride</i>	24
<i>Asplenium marinum</i>	26
<i>Asplenium ruta-muraria</i>	28
<i>Asplenium adiantum-nigrum</i>	30
<i>Asplenium lanceolatum</i>	31
<i>Ophioglossum vulgatum</i>	2
<i>Osmunda lunaria</i>	4
<i>Osmunda regalis</i>	6
<i>Osmunda spicant</i>	8
<i>Osmunda crispa</i>	10
<i>Polipodium vulgare</i>	32
<i>Polipodium lonchitis</i>	34
<i>Polipodium phegopteris</i>	36
<i>Polipodium fontanum</i>	38

L A T I N I N D E X.

	Page
<i>Polipodium thelypteris</i>	40
<i>Polipodium fragrans</i>	41
<i>Polipodium cristatum</i>	42
<i>Polipodium filix-mas</i>	44
<i>Polipodium filix-femina</i>	46
<i>Polipodium aculeatum</i>	48
<i>Polipodium lobatum</i>	49
<i>Polipodium fragile</i>	50
<i>Polipodium rheticum</i>	51
<i>Polipodium dryopteris</i>	52
<i>Trichomanes pyxidiferum</i>	56
<i>Trichomanes tunbrigense</i>	58

ENGLISH

ENGLISH INDEX.

	Page
<i>Adders Tongue</i>	2
<i>Brakes</i>	16
<i>Black Maiden Hair</i>	30
<i>Brittle Polipody</i>	50
<i>Branched Polipody</i>	52
<i>Curled Stone Fern</i>	10
<i>Crested Polipody</i>	42
<i>Cup Trichomanes</i>	56
<i>English Maiden Hair</i>	22
——— <i>Lesser</i>	24
<i>Forked Maiden Hair</i>	12
<i>Fountain Polipody</i>	38
<i>Female Fern</i>	46
<i>Harts Tongue</i>	18
<i>Lobed Polipody</i>	49
<i>Moonwort</i>	4
<i>Marsh Polipody</i>	40
<i>Maiden Hair True</i>	54
——— <i>Shining</i>	27, 55
<i>Male Fern</i>	44
<i>Osmond Royal</i>	6

E N G L I S H I N D E X.

	Page
<i>Polipody Common</i>	32
———— <i>Wood</i>	36
———— <i>Fountain</i>	38
———— <i>Marsh</i>	40
———— <i>Crested</i>	42
———— <i>Prickly</i>	48
———— <i>Lobed</i>	49
———— <i>Brittle</i>	50
———— <i>Stone</i>	51
———— <i>Branched</i>	52
<i>Rough Spleenwort</i>	34
<i>Spleenwort Smooth</i>	8
———— <i>Sea</i>	26
———— <i>Rough</i>	34
———— <i>Spear</i>	31
———— <i>Common</i>	20
<i>Stone Fern with Red Rattle Leaves</i>	14
<i>Shining Maiden Hair</i>	27, 55
<i>True Maiden Hair</i>	54
<i>Trichomanes, Cup</i>	56
<i>Tunbridge Trichomanes</i>	58

ERRATA.

IN THE INTRODUCTION.

Page 12, Line 19, *erase in.*

— 13, — 16, *after Marinum, add, Asplenium adiantum
nigrum.*

— 16, — 16, *for Equisetum, read Equiseta.*

IN THE BOOK.

— 5, — 3, *for, and the seeds when discharged, read, and
* when the seeds are discharged.*

— 9, — 2, *for red, brown, read, reddish brown.*

— 28, — 14, *for in, read by.*

— 31, — 18, *for Lychen, read Lichen.*

Throughout, for Polipodium, read Polypodium.

FILICES BRITANNICÆ;

A N

H I S T O R Y

O F

BRITISH FERNS.

PART THE SECOND.

With PLAIN and ACCURATE DESCRIPTIONS,

A N D

NEW FIGURES of all the SPECIES,

Taken from an immediate and careful Inspection of the Plants in their Natural State, Drawn of their Natural Size, and accurately Engraved.

I N C L U D I N G

An APPENDIX to the FORMER PART of this WORK,

By which the Whole is completed.

By JAMES BOLTON,

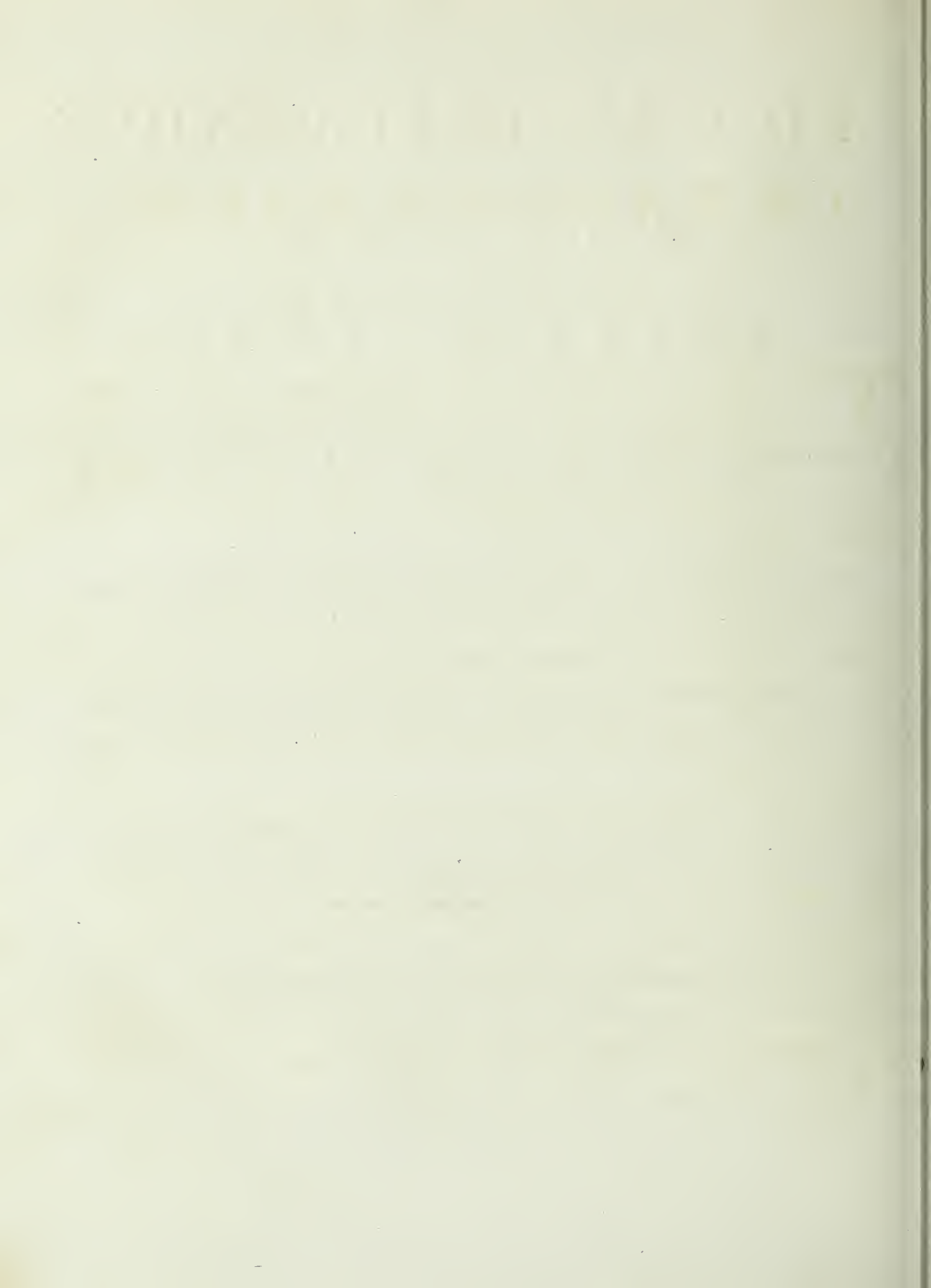
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M,DCC,XC.



INTRODUCTION

CONTINUED.

THE Genus of Plants called *Equisetum*, or Horsetail, constituting a Part of the Order FILICES in the LINNÆAN SYSTEM, together with the two other Genera, the *Isoetes* and *Pilularia*, are the subject of the present Sheets.

The Horsetails, of which no more than six species have been discovered in Great Britain (by that fondness for increasing the number of Plants which almost Universally prevailed amongst the Botanists of the last ages) have been increased to double their real number, by the Addition of imaginary *species*.

Dillenius, in the third Edition of *Ray's Synopsis*, enumerates twelve supposed species ; six of which, that are varieties only, and not species, I will here endeavour to point out.

There is a variety of *Equisetum sylvaticum*, not unfrequently to be met with by Road-sides and in Pathways, having the second leaves all turned to one side of the first leaf or *stem* ; this happens when the first leaf has been trod down, or by some Accident so bent or broken as to lie flat on the
d Ground ;

Ground; all the second leaves naturally rise upward, but they issue from all sides of the first leaf at the base of the *vagina*, in the declined, as well as in the erect Plant; the Plant in this state makes the

Equisetum sylvaticum procumbens satis uno versu dispositis.
Ray Syn. P. 131. No. 5.

There is a Variety of *Equisetum arvense*, which grows in very wet soils in close woods, amongst tall grass or under the umbrage of various other Plants, in which the leaves are very slender, and greatly drawn out in length; in which state it makes the

Equisetum pratensis longissimis setis. *Ray Syn. 131. No. 8.*

The fertile shoots of *Equisetum arvense* come up before the barren ones; these are destitute of second leaves, they are variegated with brown colours, and soon perish; in this state they are the

Equisetum nudum minus variegatum basiliense. *Ray Syn. P. 130. No. 3.*

There is a variety of the *Equisetum palustre*, which grows in shady situations or under trees, about the borders of ponds and brooks, wherein both the first and second leaves are very slender, and drawn out in length, much beyond their usual standard, and are frequently of a pale yellow-green colour; this is the

Equisetum

Equisetum palustre tenuissimis longissimis setis. Ray Syn. P. 131. No. 6.-----This through mistake has been made a variety of *Equisetum Arvense*.

There is another variety of *Equisetum palustre*, in which the branches or second leaves are fertile, producing small flower spikes on their summits. This variety, in most instances where I have had an opportunity of observing it, has been occasioned by that the primary flower spikes, of such shoots as produced secondary ones, had been bit off or otherwise destroyed; this variety is the

Equisetum palustre minus polystachion. Ray Syn. P. 131. No. 7. Tab. 5. Fig. 3.

When the *Equisetum limosum* grows in the mud at the bottom of still ponds or rivers, and is in a luxuriant state, it commonly produces plenty of branches or second leaves; in which state it makes the

Equisetum foliis nudum ramosum. Ray Syn. 132. No. 12.

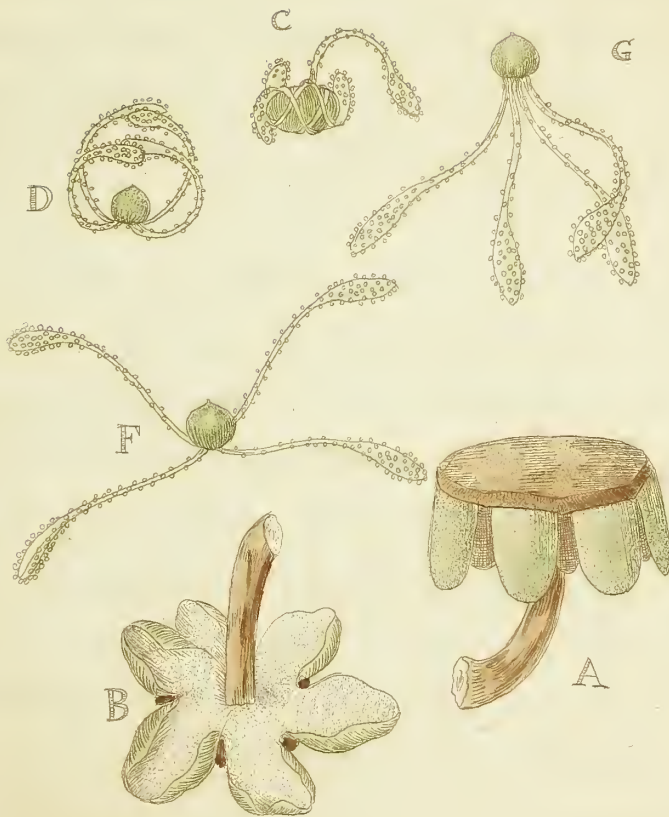
There is a variety of *Equisetum hyemale*, in which the leaves are rush-like, quite simple, and destitute of branches; in this state it makes the

Equisetum foliis nudum non ramosum sue junceum. Ray Syn. 131. No. 11.

The manner in which the seeds of the Horsetails are discharged is beautiful, and well deserves our regard. The laborious and ingenuous Hedwig has well illustrated this particular, by a number of figures, in his *Theoria Pl. Crypt. Tab. 1, 2.* And I have found the truth of his Observations by examining the same subjects, under the first magnifier of Cuff's Compound Microscope, as now sold by *Nairn and Blount*, in London ; my figures, however, vary a little from those of Hedwig.

In the annexed Plate, A, is a single shield separated from the flower spike, and magnified with its curved support, and its six feminal valves unopened. These valves open by a longitudinal future from top to bottom, on the inner side, and copiously discharge a soft downy powder, which when newly fallen or shook out may, through a moderate spy-glass, be seen to skip and leap about as if alive ; after the discharge of this powder the feminal valves or capsules remain for some time in an horizontal direction, empty and dry, as is expressed at B ; where the under side of the shield and the inside of the valves are represented.

The separate seed-vessels, if such we may call them, consist of an oval placenta, and four spoon-shaped filaments or straps ; to these last the seeds immediately adhere. While
these





these seed-vessels are included in the feminal valves, the straps are rolled round the placenta, in two opposite spiral directions, as is expressed at C, where they are beginning to unroll ; at D, they are represented as farther disengaged ; at F, they are quite expanded ; and at G, the elastic force of the filaments being quite exhausted, they are at rest. This unrolling of the straps or filaments, however, is not gradual, as I have represented it, but performed in an instant, by a sudden jerk ; by which the seeds are thrown off with force, and committed to the air, where they float innumerable. *What is their use ?* Certainly they are produced for other purposes besides the propagation of the species ; every perfect seed spike produces millions of these, and yet the plant is propagated by the root ; nay, so rarely do the seeds answer the purpose of propagation, in this family, that I could never yet discover a seedling plant of any one of the species.

The same observation holds good, in respect to all the other Ferns, and to the Fungi ; the multitude of seeds produced by an Agaric or a Boletus, is innumerable ! is astonishing ! yet not one of ten thousand answers the purpose of propagation. Is not the Air we breathe charged with them all the declining part of the year ? Do we not receive them into our Lungs with every breath we draw ? Whence proceed the Quinsies,

Quinsies, Coughs, and other complaints, which prevail in Autumn?

I am not here to inquire into their noxious or salutary effects, when received into our Lungs ; yet it cannot surely be amiss, to drop this short hint to those whose province it is to make such inquiries.

Stannary, near Halifax,

October 16, 1790.

FILICES BRITANNICÆ.

PART THE SECOND.

EQUISETUM.

Lin. Gen. Plan. 1169.

EQUISETUM sylvaticum.

Lin. Sp. Pl. 1516. *Flo. Ang.* 447. *Scot.* 664. *Cant.* 383. *Ray*
Syn. 131. *Ger. Em.* 1114. *Park.* 1201.

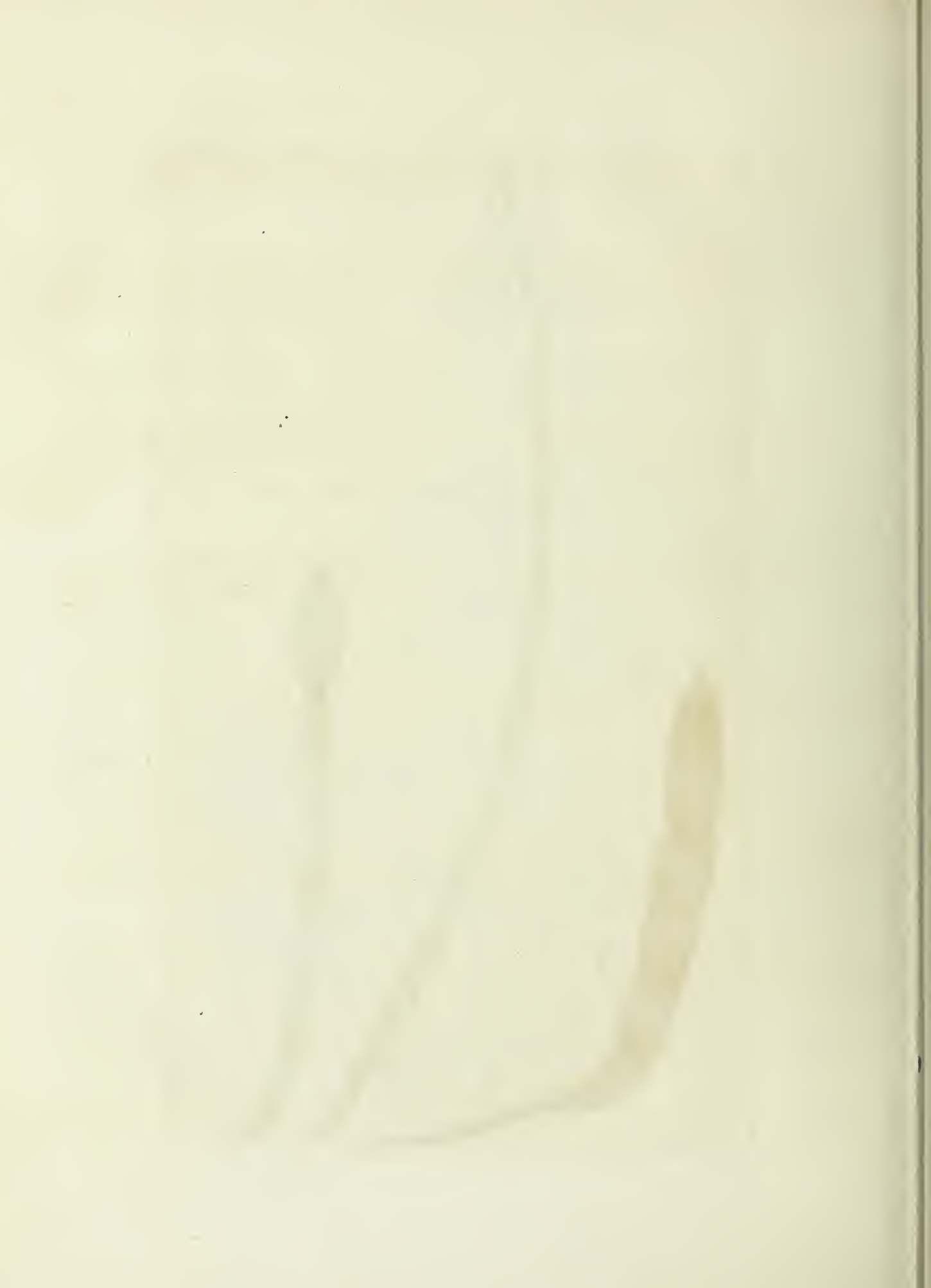
T A B. XXXIII.

WOOD HORSETAIL.

FROM a brown, jointed, fibrous, tough, creeping root, the fertile shoots begin to appear about the end of March, or beginning of April. These shoots at their first appearance are of a dark rusty-brown colour on the outside, which is composed of several vaginæ, of a thin filmy substance, and lie over one another in an imbricated order; each separate vagina is divided in three or four dents at the rim, and marked with about twelve striæ at the base, as at b. From the uppermost of these vaginæ the flower spike appears; it is of an oval or oblong figure, consists of numerous hexangular shields, close thrust together, their upper or naked part of a pale brown colour, and a smooth surface. As it advances in growth, these shields separate, and the feminal valves under each shield are librated, and discharge the seeds in form of a soft, downy, bluish powder. By this time the stem has attained the height of eight or ten inches; it is of a smooth surface, and a pale-green colour. The second leaves make their first appearance like little teeth, in a circle, round the base of the uppermost vagina, as expressed in the Plate at a; where I have shewn them at the base of the third vagina. When this first circle has made some progress in growth, another circle begins to appear in like manner, at the base of the second vagina, and thus proceeds downwards, as is expressed in the shoot a, *Tab.* 34.

The





The second leaves are jointed, and have vaginæ at the joints; from the base of which vaginæ the third leaves are produced, three or four from each joint.

These third leaves, like the first and second, are jointed and vaginated; and, in some luxuriant specimens, I have seen fourth leaves of a similar structure.

B A R R E N L E A V E S, *Fig. c.*

These spring from different parts of the same root, which produces the fertile ones, and like those are at first wholly covered with vaginæ, but are readily distinguished from them, by being much smaller, and of a pale, dusky, green colour.

From the uppermost vagina, the rudiments of the second leaves make their first appearance, in form of a close, rough, pale-green, tapering spike.

The vaginæ are green, except at the point, where they are divided in four brown dents, as in the fertile shoots; but in this they are smaller, and embrace the stem more closely than in that.

The second leaves are about twelve in number, produced in circles from the base of the vaginæ, each having a proper, brown, short, tridentate vagina, at its base; they are quadrangular, jointed, and have quadridentate vaginæ, from the base whereof grow the third leaves, three or four at a joint, and are of the same structure with the second. A full grown second leaf is seen in the Plate, at d.

It grows in wet, sandy soils, in woods and meadows about *Halifax*, abundantly.

E Q U I S E T U M arvenſe.

Lin. Sp. Pl 1516. *Flo. Angl.* 447. *Scot.* 647. *Cant.* 344. *Ray*
Syn. 130. *Ger. Em.* 1114. *Park.* 1202.

T A B. XXXIV.

C O R N H O R S E T A I L.

THE root is of a dark brown or blackiſh colour, jointed at equal diſtances, emits numerous black fibres from the joints, and creeps to a great diſtance under the ſurface.

The fertile ſhoots at *a*, make their appearance about the end of March; the flowering ſpike being at firſt hidden under the brown imbricated vagina; when the ſpike firſt appears it is of a greeniſh colour, afterwards changes to brown, and when at maturity the valves open, and diſcharge a pale coloured downy powder, which is the ſeed.

The ſtem is round, ſmooth, hollow, and of a pale pleaſant brown, it conſiſts of ſeven or eight joints, each ſurrounded by the baſe of a fuſcous vagina, which is a little inflated, and divided at the top in about twelve narrow, pointed, brown ſegments. This ſtem very rarely produces any ſecond leaves; it generally falls and diſappears before the appearance of the barren leaves.

B A R R E N L E A V E S.

The barren leaves, *b*, appear in April, and grow from the ſame roots as the fertile ones; at their firſt coming up the ſecond leaves are hidden under the vagina, but ſoon make their appearance in about twelve ſhort whirls, and form the reſemblance of a rough ſpike. When full grown it is about two feet high from the root to the top, and conſiſts of fifteen or
 twenty





twenty joints ; five or six of which joints are destitute of second leaves, but are, as well as the rest, surrounded each with a vagina, not inflated as in the fertile shoot, but closely embracing the stem ; they are of a pale-green colour, and each is divided in about twelve black acute points at the margin.

The second leaves grow from the base of the vaginæ, at the joints of the first leaf ; each has a pale-coloured, pellucid, quadridentate, proper vagina, at its base ; each consists of eight or ten joints, quadrangular, with quadridentate vaginæ at each joint. In the specimen before me, the first leaf consists of sixteen joints, five of which, from the root, produce no second leaves ; at the sixth the leaves are shorter than at the seventh, and grow gradually a little longer upwards to the tenth, from whence they diminish to the top, where they are shortest.

The barren leaves in this plant so nearly resemble those of the *Equisetum palustre*, in some stages, that they are not easily distinguished at first sight ; but may at all times be known by this remark, That the second leaves in the arvense are quadrangular, and the vaginæ quadridentate ; but in the palustre they are pentangular and quinquidentate.

The fertile shoots of this species cannot be distinguished from those of the *Equisetum sylvaticum*, before the second leaves appear, except by the number of lacinæ into which the vaginæ are divided, in the first being twelve, in the last three or four.

It grows in shady moist places about woods and rivulets, and flowers in April.

EQUISETUM palustre.

Sp. Pl. 1516. *Flo. Angl.* 448. *Scot.* 648. *Cant.* 384. *Ray Syn.* 131.
Tab. 5. *Fig.* 3. *Var.* b. *Ger. Em.* 1113. *Park.* 1202.

T A B. XXXV.

MARSH HORSETAIL.

THE root is slender, black, jointed, and creeping; emitting black hard fibres from the joints.

The fertile shoots are slender, and of a fresh green; they are eight or ten inches high, and consist of seven or eight joints, surrounded with vaginæ; two or three of the lowest of which are wholly black, the others green, except the top, which terminates in seven or eight black acute dents, with white filmy margins.

The uppermost vagina, which is placed immediately under the spike, is longer than any of the rest, and is divided in very long, slender, black dents.

The flower spikes are smaller than in any of the other species, black at first, but pale-coloured when full grown; the feminal valves being white, and discharging a pale-coloured powder.

The first leaves produce second leaves at the base of the vaginæ, which grow erect, each having a proper black vagina at its base; they
 are





are unequal in length, consisting of an uncertain number of pentangular joints, with quinquidentate black vaginæ at each joint.

B A R R E N L E A V E S,

These grow from the same root with the fertile ones, and resemble them in substance and colour, but are taller and consist of more numerous joints; in a full grown plant, twenty or more; and the second leaves are also longer and more numerous. One of the second leaves is a little magnified at a.

It grows in marshy places, about brooks and woods. On the banks of the canal below *Mear-Clough-Bottom*, near *Halifax*, plentifully, along with the two former species; it flowers in May.

It is distinguished from the *Equisetum limosum*, by being a lesser plant, by its small black root, by having fewer dents in the vagina, and in that the first leaves always produce secondary ones about the joints; but in the *limosum* they are frequently naked.

Sometimes the secondary leaves are fertile, producing small flower spikes on their summits, as figured by Dillenius, in Ray's Synopsis, *Pl.* 5. *Fig.* 3.

I have seen the secondary leaves fertile, but never, except in instances where the primary flower spike had been bit, or accidentally broken off.

EQUISETUM fluviatile.

Sp. Pl. 1517. *Flo. Ang.* 448. *Scot.* 649. *Cant.* 385. *Ray Syn.* 130. *Hall. Hist.* 1675. *Ger. Em.* 1113. *Park.* 1290.

T A B. XXXVI. XXXVII.

RIVER HORSETAIL.

FROM a jointed, black, fibrous, creeping root, as in the other species, the fertile shoots, a. make their appearance in April; they are at first surrounded by large, rough, husky, imbricated, brown vaginæ; each divided in about twenty-four long, narrow, pointed, rust-coloured segments; from the uppermost of these the flower spike is produced.

The shields at first are smooth, closely compacted together, and of a brown colour.

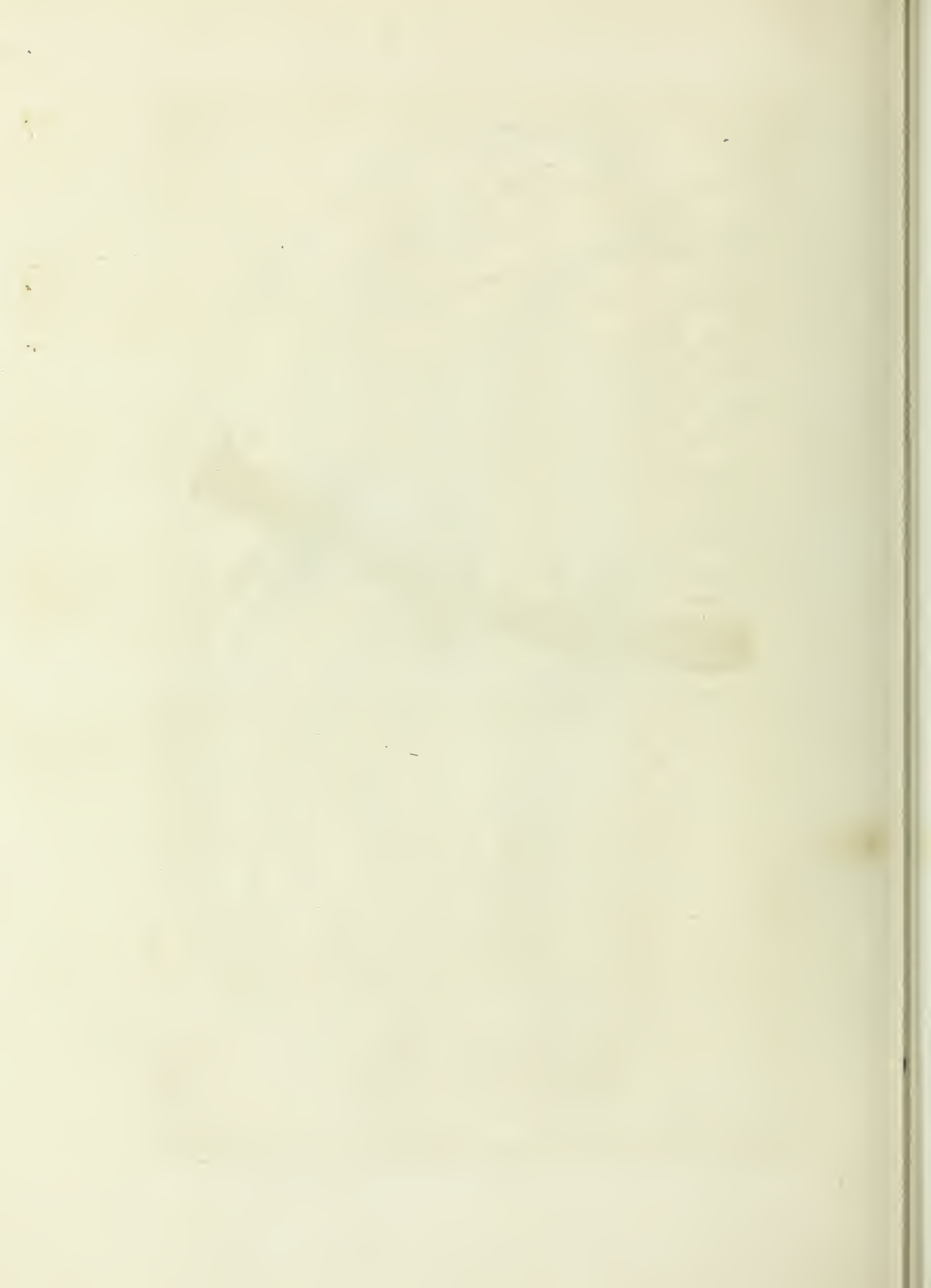
The spikes, when full grown, are three inches long, and of a proportionable thickness; the feminal valves are white, and when the spike is in full blow it makes an elegant appearance.

The fertile stems, A, grow about a foot high, and consist of eight or nine vaginated joints, but produce no second leaves.

BARREN







BARREN LEAVES.

The barren leaves, *Tab. 36, B.* and *Tab. 37*, are entirely covered by the vagina, till they attain the height of ten or twelve inches; in this state they are of a mixed brown and green colour, terminating in an acute point at top, and, by the numerous divisions of the vagina, seem as if furrounded with a rough, hairy, or bristly covering.

From the joints, towards the top of the stem, the second leaves first make their appearance in close circles round the base of each vagina, as *Fig. B. Tab. 26*. Each circle is furrounded at its base by the brown lacinæ of the vagina next below it.

The second leaves when full grown, *Tab. 37*, are quadrangular, five or six inches long, and grow about thirty in a circle; each consists of seven or eight joints, with black vagina, and having a proper brown vagina, supported by a black scale at its base. *b*, the proper vagina. *a*, the black scale, *Tab. 37*.

The barren leaves, in a proper foil, rise to the height of five or six feet, and when fresh and full grown are very elegant. The figure, *Tab. 37*, represents four joints of the first leaf, with three circles of second leaves, and, I think, gives a better idea of the plant, than could have been conveyed by giving a whole figure, so much reduced in size, as to bring it into the compass of my plate.

Grows in marshy places, and about the borders of rivers. The specimens from which I took the figures, were sent me, in a fresh state, by my obliging friend Mr. Edward Robson, of *Darlington*, in the county of *Durham*.

EQUISETUM limosum.

Sp. Pl. 1517. *Flo. Ang.* 448. *Scot.* 648. *Cant.* 385. *Ray Syn.*
131. *Tab.* 5. *Fig.* 2. *Hall. Hist.* 1677.

T A B. XXXVIII.

SMOOTH HORSETAIL.

THE root, A, is large, tough, branched, jointed, and vaginated; it is of a rusty brown colour, and creeps horizontally under the mud.

The young shoots appear in April, and are covered with brown rust-coloured vagina; each of which is divided in twelve or fourteen black acute dents, at the top. The spaces between the vaginæ are of a pale green, and smooth surface.

In the full grown plant, the vaginæ change to a pale green, retaining only a faint tinge of brown near the base of the dents, which still remain black. The uppermost vagina of the fertile leaf is paler, more large, more lax, and the black dents longer than in the rest; and the stem above it, which supports the flower spike, is white.

The shields, which compose the flower spike, are at first black, and close thrust together; when the spike opens, the feminal valves are of a pale colour, and copiously discharge a white powder.

The



EQUISETUM limosum.

Sp. Pl. 1517. *Flo. Ang.* 448. *Scot.* 648. *Cant.* 385. *Ray Syn.*
131. *Tab.* 5. *Fig.* 2. *Hall. Hist.* 1677.

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The





The fertile leaves consist of fewer joints than the barren, and sometimes produce a few second leaves at the base of the vaginæ.

B A R R E N L E A V E S,

The barren leaf which is cut into three parts, in the plate, *Fig. B*, rises from the same root as the fertile leaf, and consists, when full grown, of twenty-six or thirty joints, rises to the height of three feet or more, is of a fresh green colour, and smooth surface, while young; when dry, becomes channelled, with twelve or fourteen furrows. The joints are closely embraced by the vaginæ, while the plant is fresh; when dry, the stem is contracted, the vaginæ are lax, and spread out at the margin.

The first leaves are most commonly simple and naked, as at *B*; but sometimes one or two branches rise from the lower joints, as at *C*; which branches are of the same structure as the first leaf or principal stem.

The first leaves also sometimes produce proper second leaves, *D*, from the base of the upper vaginæ; two or three of these at a joint, sometimes, though rarely, six or seven; they are unequal in length, jointed, pentangular, and the joints surrounded with a black quinquidentate vagina.

Grows in shallow ponds and standing waters; and flowers in May.

EQUISETUM hyemale.

Sp. Pl. 1517. *Flo. Angl.* 448. *Scot.* 650. *Cant.* 385. *Ray Syn.* 131. *Hall. Hist.* 1679. *Ger. Em.* 1113. *Park.* 1207.

T A B. XXXIX.

ROUGH HORSETAIL.

THE root is black, hard, tough, jointed, creeping, and, emitting black, tough, hard fibres from the joints.

The fertile shoots, at their first appearance, are clubbed at the top, by reason of the flower spike, which is wrapped up in the uppermost vagina.

This uppermost vagina is divided, at the margin, in twelve or fourteen pointed dents or segments; whereas all the other vaginæ terminate in very short, blunt, black dents.

The shields, in the flower spike, are closely thrust together, and black at first; when the flowers are blown, the feminal valves are white, and discharge a bluish soft powder.

The full grown stem is about twenty-four inches high, consisting of nine or ten joints, the remotest of them about three inches asunder; and
each



E. arvense L.

each surrounded with a short lax vagina, black at the base and margin, but of a pale green in the middle.

The spaces between the joints are of a strong bluish green, channelled with twelve or sixteen furrows, and having alternate ridges, which are armed with hard, short, rough spines, regularly placed in one line, along each ridge, as is expressed at b; where a vagina, a, and part of the stem are magnified.

The stem, as in the other species, consists of a number of fistular tubes, which are bound together by an external and internal bark, and form one general fistular tube. In this species the inner bark is smooth and white.

The barren leaves in this species are not to be distinguished from the fertile in any thing, but the want of fructification, and in their upper extremities terminating in a fine point.

Both the one and the other are most commonly simple, but sometimes emit one or two branches from the lower joints, as is expressed in the plate. These are of the same figure and structure as the primary leaves, only smaller, and consisting of fewer joints.

This species is distinguished by the short obtuse dents of the vaginæ, by the remoteness of the joints, by the roughness of the touch, and by being an evergreen.

The only places where I have seen it grow, are amongst the bushes close by the brook at the lower end of the *Helk*, near *Ingleton*; and in a field, belonging to an estate called *Upper Brier*, in *Northowram*, near *Halifax*.

PILULARIA.

Lin. Gen. Plan. 1183.

PILULARIA globulifera.

Sp. Pl. 1653. *Flo. Ang.* 462. *Scot.* 682. *Ray Syn.* 130. *Vail. Paris.*
Tab. 15. *Fig.* 6. *Dill. Musc. Tab.* 79, *Fig.* 1. *Flo. Dan. Tab.* 223.

T A B. XL.

PEPPER GRASS.

WHAT has been called the root in this plant, may perhaps not improperly be termed the first leaf, or main stem of the plant. It creeps on the surface of the ground, in various winding directions, is of a brownish-green colour, having knots or joints at distances.

At each knot of the creeping stem, the roots, consisting of three or four strong white fibres, run down into the moist sand, among which it grows; and at the same knots or joints, on the upper side of the stem, the second leaves are produced, two or three together. While young they are coiled up in a close curl, like most other of the ferns; when full grown they are about three inches long of a fresh green colour; each
 one





one having a brown, dusky, granulated line, on the inner side; which is the male flower.

On the creeping stem, in the centre of these tufts of leaves, the seed-vessels are produced; they are about the size of a pepper-corn, and of the same figure; at first green; when at full growth of a brown colour, and covered with a short hairy shagginess; they are divided into four cells, and filled with small, brown, globular seeds. When the plant dries it changes to a brownish colour.

Grows in wet sands, in places sometimes overflowed with fresh water. It grows in several parts of *Wales*, and, as is said, on *Honslow-Heath*; and is in perfection in July.

I S O E T I S.

Lin. Gen Plan. 1184.

I S O E T I S lacustris.

Sp. Pl. 1563. *Flo. Angl.* 462. *Scot.* 683. *Dan.* 191. *Ray Syn.* 306. *Dill. Musc. Tab.* 80. *Fig.* 2.

T A B. XLI.

QUILL W O R T.

THE root consists of numerous strong, white, round fibres, which are connected together under the base of the leaves, and descend deep into the mud, at the bottom of lakes.

The leaves grow eight or ten from the same root, are four or five inches long, flat or plain on the inside, round or gibous on the outside; each consists of several fistular tubes, slender, and imbedded in a soft spongy substance. These tubes are furnished with small diafragms, at certain distances, and are surrounded with one common, smooth, pale-green cover; and thus the leaf is constructed. When newly taken out of the water, it is pellucid; and, if viewed between the eye and the
light





light, the diafragms, in the internal small tubes, may be easily discerned.

The outer leaves are greatly swollen and dilated at the base, as at a, b, c; where the fructification is lodged. The stile and stigma are placed in the hollow part of the base of the outer leaves; the germin is supported by a cordate valve, or flower-cup, as at e; and the edges of the inflated base, of these outer or female leaves, is a thin fine membrane, which so closely embraces and surrounds the gibous part of the male leaf within as to exclude the water.

The inner or male leaf, b, opens on the outer or gibous side of the base, within the embraces of the female leaf. Its fructification consists of a roundish anthera, without filament; and it rests on a cordate valve or flower-cup, similar to that of the female. By the above admirable contrivance, the two flowers come in near contact with each other, and, though in the bottom of deep lakes, are secured from the intrusion of the water.

The seed-vessel is of an oblong form, consisting of two valves, filled with white globular seeds; each of which is girt round with a prominent ring, as at d. After the discharge of the seeds, the outer leaves fall off and perish, and the next in order perform the same office a succeeding year; and the number of leaves is kept up by a supply of young ones from the centre.

Grows in lakes on high mountains. I have dragged it out of several lakes on *Snowden*, and it has been sent me from *Westmoreland*.

A N

A P P E N D I X

T O T H E

FIRST PART of this HISTORY of FERNS.

ACROSTICHUM. Part I. Page 21.

ACROSTICHUM alpinum.

Frondeb. subbipinnatis, pinnis remotis subalternis, lobis rotundis subcrenatis subtus hirsutus, stipite lævi. Pluk. Phyt. Tab. 89. Fig. 5. Barrelier Icon. 432. Fig. 2.

T A B. XLII.

ALPINE ACROSTICHUM.

THE root of this little Acrostichum consists of a few black, hard branches, connected to a small head, and furnished with black, hard, capillary fibres.

The rib of the first leaf, when full grown, is about three inches high, of a pale, brownish-green colour, slender and smooth, being quite destitute of hairs.

Second leaves, six or seven pairs, opposite below, alternate above, of a triangular figure, obtuse at the corners; three or four of the lowest pairs being all of equal size, and remote; two or three of the upper gradually lessening, and growing closer together.

Lobes



Strictly copied from the Plant. by James Bolton.



Lobes of the second leaves most commonly five ; two on each side of the rib, and one at the end ; they are of a roundish figure, grow close together, and are obscurely crenated round the margin. The colour on the upper side is a brownish kind of green ; the under side thickly covered with a brown hairy nap.

The lower figure represents one of the second leaves, as it appeared when a little magnified ; the seed vessels are disposed in three or four clusters, on each lobe, partly hidden amongst numerous, strong, brown, hair-like filaments, by which also the whole under side of the leaf, quite to the margin, is thickly covered.

The specimen above described is very exactly figured on plate 42, and is a plant so perfectly distinct from the *Acrostichum ilvense*, in its usual state, that it seems to me unreasonable to suppose them both of the same species.

The *Acrostichum ilvense*, described in the former part of this work, page 14, and accurately figured on plate 9, was brought from *Snowden*. *Oeder*, in *Flora Danica*, has given an excellent figure of the same plant, *Tab. 391*. And the figure in *Pluk. Phyt. Tab. 179, Fig. 4*, (which is cited by Linnæus, in *Flo. Suecica, Ed. 2. No. 938*,) agrees pretty aptly with both *Oeder's* and my own : But are all very different from the *Acrostichum alpinum* above described.

The specimen figured on plate 42, was brought from *Scotland*, but the plant is also a native of *South-Britain* ; for in a volume of dried plants, collected by the late Mr. T. Knowlton, I have seen specimens of the same plant, with this note, in his own hand writing, *From the Mountains of Wales*. From these, and some other circumstances, I am induced to think, that two species of British Ferns have been confounded together, under the name of *Acrostichum ilvense* ; and I believe that future observation will confirm the truth now discovered.

ACROSTICHUM

ACROSTICHUM thelypteris.

Sp. Pl. 1528. *Flo. Suecica. Ed. 2.* 928. *Lobel. Icon.* 814. *Filix querna repens. Park.* 1041.

T A B. XLIII. XLIV.

LADIES' ACROSTICHUM.

THE root creeps horizontally under the surface of the ground, is of a black colour and brittle substance, crooked, and about the thickness of a duck's quill; it emits many branches, the size of small pack-thread, which are hung round with numerous, dark brown, capillary fibres.

From the root, as it creeps along, the first leaves rise at distances, two or three near together. The rib is from nine to fifteen inches high, smooth and naked, very slender, and of a pale herby colour.

The second leaves from ten to fifteen pairs, opposite, except one or two of the lowest pairs; lower pairs remote, growing gradually closer upwards, longest about the middle pair, all of them lance-shaped, and placed nearly at right angles with the rib of the first leaf.

Lobes of the second leaves ten or twelve pairs, divided down to the nerve; they are broad, short, rounded off at the extremity, and quite smooth and entire on the edges; their upper surface smooth and plain, not obviously marked with veins, as in the *Polypodium thelypteris*; this circumstance, together with its creeping root, and its being a much smaller



Exhib. on the Copper immediately from the Plant September the 26. 1790. By J. Bolton at Hammar near Halifax.



smaller plant, are sufficient at all times to distinguish it from that; though a resemblance in habit and external appearance has caused the two species to be confounded together. This, however, could not have happened, had a strict regard been had to the fructification in both.

In the *Polypodium thelypteris*, the seed-vessels are arranged in close regular lines, along the margin of the lobes; at first of a pale colour, changing brown in the progress; and, after the discharge of the seeds, spread out in breadth so as to occupy the whole disk, except the middle only; this, however, is not always the case, for in some specimens the lines remain distinct and separate to the last; and in those most effectually covered, the disposition and arrangement of the seed-vessels, in marginal lines, remain visible.

But in the specimen of *Acrostichum thelypteris* now before me, which is in a middle state of growth, and is accurately figured, *Tab. 43, Fig. a*, some of the seed-vessels are visible, as is expressed at *Fig. c*; they are small, white, and placed irregularly on each side of the nerve; some are further advanced in growth than others; and the whole disk, when a little magnified, appears beset with small tubercles, under which other seed-vessels, yet in embryo, are lodged.

In the full grown plant, of which two second leaves are figured, *Tab. 44*, on *Plate 45*, the whole under side, except the margin only, is closely covered with small seed-vessels, and they originate in every part of the disk, as in the genus *Acrostichum*, not in regular lines or rows, as in *Polypodium*. *Fig. a.* in *Tab. 44*, is a single lobe magnified.

The barren leaves, *Fig. b*, were in a state of half growth in the specimens I examined; after the decay and fall of the second leaves, the rib of the first leaf turns brown, and abides on the root over winter.

POLYPODIUM. Part I. Page 32.

POLYPODIUM rhæticum.

Sp. Pl. 1552. *Ray Syn.* 124. *Pluk. Phyt. Tab.* 89. *Fig.* 4.

T A B. XLV.

RHETIAN POLYPODY.

THE root of this plant, I have not had an opportunity of observing.

In the specimen before me, the height of the *frons*, or first leaf, is about twelve inches; the rib is of a pale colour, furrowed on the upper side, convex or rounded on the under; is more stout, and much less brittle than that of the *Polypodium fragile*.

The second leaves are about twelve pairs, placed alternately, very remote below, growing gradually nearer each other upwards, but are distinct quite to the top; they are placed at an acute angle with the middle rib.

The third leaves are divided, down to the nerve, into about three pairs of distinct lobes, of an oval figure, sharply and distinctly serrated about the edges.

Those third leaves which grow on the upper side of the rib of the second leaf, are larger than those which grow on the lower; by which character alone the species is at once distinguished from the *Polypodium fragile*, with some varieties of which it has been confounded.

The inequality of size in the upper and lower third leaves, is most obvious in the first pair; for in some of the upper pairs, the triple division







vision ceases, and the second leaf terminates in distinct, sharply serrated lobes.

The seed-vessels are placed in round dots, on the under side of the lobes; two or three on the smaller, five or six on the larger; they are of a brown colour, and distinct. The whole plant is larger, firmer, more robust, and of a stronger green than the *Polypodium fragile*.

The *Polypodium fragile* in some of its states, see part 1, page 51, so nearly resembles the *Polypodium rhæticum*, that others, as well as myself, have been deceived by it. Hallar, Wais, &c. seem to doubt its existence; and it appears from their descriptions, that they had not examined the true *Polypodium rhæticum*; no more had I, otherwise so obvious a character as the inequality of size in the third leaves, on the opposite sides of the rib of the second leaf, could not have been disregarded.

In my plate of varieties, *Part 1, Tab. 2*, those of the *Polypodium fragile* not being sufficiently expressed, at the instance of several friends, I have added *TAB. XLVI*; in which I have carefully copied these varieties. For on the two stems given in the plate, by varying the second leaves, as I found them in separate specimens, I have represented all those varieties which have been supposed most to resemble the *Polypodium rhæticum*.

Specimens of *Polypodium rhæticum* and *Acrostichum thelypteris* were sent me by my friend Dickson, author of the *Plantarum Cryptogamicarum Britanniae*; the first he gathered in *Scotland*, the last, he informs me, grows in plenty about *Norwich*.

ERRATA IN THE FIRST PART.

INTRODUCTION, p. 6, l. 17, for *supine* r. *prone*.—P. 16, l. 3. r. *Anglica*.—In the Book, p. 5, l. 3. r. and when the seeds are discharged.—P. 40, l. 2, 3, erase *Ger. Em. & Park*.—P. 41, l. 1, tab. 22.—P. 41, l. 3, erase from this, and the rest of the sentence.—P. 51, l. 15, erase this is, and the rest of the sentence;—same line, after *delicate*, add tab. 46.—Throughout the Book, for *Polipodium* r. *Polypodium*.

INDEX to the SECOND PART.

L A T I N.		E N G L I S H.	
	Page.		Page.
A Crostichum alpinum	76	A LPINE Acrostichum	76
Acrostichum thelypteris	78	Brittle Polypodium, Varieties	81
Equisetum arvense	62	Corn Horsetail	62
Equisetum fluviatile	66	Ladies' Acrostichum	78
Equisetum hyemale	70	Marsh Horsetail	64
Equisetum limosum	68	Pepper Grass	72
Equisetum palustre	64	Quill Wort	74
Equisetum sylvaticum	60	Rhetian Polypody	80
Isoetis lacustris	74	River Horsetail	66
Pilularia globulifera	72	Rough Horsetail	70
Polypodium rhæticum	80	Smooth Horsetail	68
Polypodium fragile, Var.	81	Wood Horsetail	60

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